Primary Prevention of HypertensionClinical and Public Health Advisory From the National High Blood Pressure Education Program

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Primary Prevention of Hypertension

Clinical and Public Health Advisory From the National High Blood Pressure Education Program

Paul K. Whelton, MD, MSc
Jiang He, MD, PhD
Lawrence J. Appel, MD, MPH
Jeffrey A. Cutler, MD, MPH
Stephen Havas, MD, MPH, MS
Theodore A. Kotchen, MD
Edward J. Roccella, PhD, MPH
Ron Stout, MD, MPH
Carlos Vallbona, MD
Mary C. Winston, EdD, RD
Joanne Karimbakas, MS, RD
for the National High Blood Pressure Education Program Coordinating Committee

The National High Blood Pressure Education Program Coordinating Committee published its first statement on the primary prevention of hypertension in 1993. This article updates the 1993 report, using new and further evidence from the scientific literature. Current recommendations for primary prevention of hypertension involve a population-based approach and an intensive targeted strategy focused on individuals at high risk for hypertension. These 2 strategies are complementary and emphasize 6 approaches with proven efficacy for prevention of hypertension: engage in moderate physical activity; maintain normal body weight; limit alcohol consumption; reduce sodium intake; maintain adequate intake of potassium; and consume a diet rich in fruits, vegetables, and low-fat dairy products and reduced in saturated and total fat. Applying these approaches to the general population as a component of public health and clinical practice can help prevent blood pressure from increasing and can help decrease elevated blood pressure levels for those with high normal blood pressure or hypertension.

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A DIRECT POSITIVE RELATIONship between blood pressure and cardiovascular risk has long been recognized. This relationship is strong, continuous, graded, consistent, independent, predictive, and etiologically significant for those with and without coronary heart disease[1,2]; it has been identified in both men and women, younger and older adults, different racial and ethnic groups, different countries; and applies to those with high-normal blood pressure as well as those with hypertension.[1,3]

Despite progress in prevention, detection, treatment, and control of high blood pressure, hypertension remains an important public health problem. Based on the Third National Health and Nutrition Examination Survey (NHANES III), approximately 43 million noninstitutionalized US adults, 18 years of age or older, met the criteria for diagnosis of hypertension (systolic blood pressure ≥140 mm Hg or diastolic blood pressure ≥90 mm Hg, or taking antihypertensive medication) recommended in *The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (JNC VI).[4-6] Almost 13 million additional persons had been diagnosed as having hypertension by a health care professional but did not meet the previously mentioned JNC

Author Affiliations: Department of Epidemiology and Medicine, Tulane University Health Sciences Center (Dr Whelton) and Department of Epidemiology, School of Public Health and Tropical Medicine (Dr He), Tulane University, New Orleans, La; Departments of Internal Medicine, Epidemiology, and International Health, Johns Hopkins Medical Institutions, Baltimore, Md (Dr Appel); Division of Epidemiology and Clinical Applications (Dr Cutler) and National High Blood Pressure Education Program, Office of Prevention, Education, and Control (Dr Roccella), National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, Md; Department of Epidemiology and Preventive Medicine, University of Maryland School of Medicine, Baltimore (Dr Havas); Department of Medicine, Division of Endocrinology, Metabolism and Clinical Nutrition, Medical College of Wisconsin, Milwaukee (Dr Kotchen); Health Care Research Center, The Procter and Gamble Company, Mason, Ohio (Dr Stout); Department of Family and Community Medicine, Baylor College of Medicine, Houston, Tex (Dr Vallbona); American Heart Association, Dallas, Tex (Dr Winston); and American Institutes for Research Health Program, Silver Spring, Md (Ms Karimbakas).
Corresponding Author and Reprints: Edward J. Roccella, PhD, MPH, Coordinator, National High Blood Pressure Education Program, National Heart, Lung, and Blood Institute/NIH, 31 Center Dr, MSC 2480, Bethesda, MD 20892-2480 (e-mail: roccella@nih.gov).

VI criteria.[4] Approximately 20 million of the estimated 43 million persons with hypertension were not being treated with antihypertensive medication, and almost 12 million of the nearly 23 million for whom such medication was being prescribed had inadequately controlled hypertension.[4] More than 23 million adults had high-normal blood pressure (130-139 mm Hg systolic or 85-89 mm Hg diastolic), and almost 38 million had normal but above optimal blood pressure levels (120-129 mm Hg systolic or 80-84 mm Hg diastolic).

Primary prevention of hypertension provides an opportunity to interrupt and prevent the continuing costly cycle of managing hypertension and its complications.[7] The purpose of this article is to update the 1993 *National High Blood Pressure Education Program Working Group Report on Primary Prevention of Hypertension*[7] and to address the public health challenges of hypertension described in the JNC VI report.[6]

METHOD OF GUIDELINE DEVELOPMENT

The National High Blood Pressure Education Program (NHBPEP) Coordinating Committee consists of representatives from 38 national professional, public, and voluntary health organizations and 7 federal agencies. As part of the mission to translate research results into practice, the NHBPEP Committee develops guidelines, advisories, and statements for the clinical and public health communities. Since the first statement on the primary prevention of hypertension was published in 1993,[7] new and further evidence supporting those recommendations has emerged.

The National Heart, Lung, and Blood Institute (NHLBI) staff identified research suggesting the need to update the NHBPEP 1993 report. The chair of the Coordinating Committee appointed co-chairs and additional members to serve as a working group on behalf of the Coordinating Committee. To assist the co-chairs, NHLBI staff conducted a MEDLINE search of the English-language, peer-reviewed scientific literature from 1993 through 2001 using key Medical Subject Headings (MeSH) terms *hypertension, blood pressure, primary prevention, exercise, weight loss, alcohol drinking, diet sodium-restricted, dietary potassium,* and *diet*.

The co-chairs reviewed the MEDLINE search results, identified new areas to be addressed, and, with the assistance of NHLBI staff, developed an outline and subsequently assembled a working draft of the document. The draft document was distributed to the members of the working group for additions and modifications. Thereafter, the additions and modifications were tabulated and discussed via teleconferencing and electronic mail. This process continued among members of the working group, NHLBI staff, and co-chairs in a reiterative fashion. The co-chairs adjudicated differences of opinions. The assembled document was mailed to the working group members for their final comments. The co-chairs then revised the document and forwarded it to the entire Coordinating Committee for review and comment. A working group member presented the report to the entire NHBPEP Coordinating Committee at its February 2002 meeting, and they provided oral and written comments to be included in the document. Two meetings of NHLBI staff and the co-chairs were held to address and incorporate the Coordinating Committee comments. Thereafter, the penultimate draft of the report was prepared and sent to the Coordinating Committee who unanimously voted to approve it.

The development of this report was funded entirely by the NHLBI. The members of the working group, Coordinating Committee, and reviewers served as volunteers.

Evidence Classification

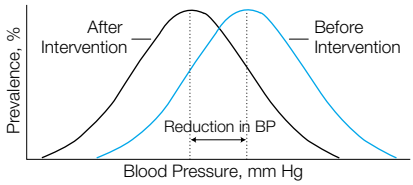
The studies that provided evidence supporting the recommendations of this report were classified and reviewed by the staff, co-chairs, and working group members. The scheme used for classification of the evidence is adapted from Last and Abramson[8] and has been used previously.[6] (See boxed note before Reference List for the classification scheme.)

LIFETIME BURDEN OF ELEVATED BLOOD PRESSURE

Age-related increase in blood pressure is a typical occurrence in most but not all populations. Accordingly, the prevalence of hypertension increases with increasing age, such that more than 1 of every 2 adults older than 60 years of age has hypertension.[4] Experience in the Framingham Heart Study suggests that the residual lifetime risk for hypertension is 90%, and the probability of receiving antihypertensive medication is 60% for middle-aged and elderly individuals.[9] High blood pressure increases morbidity and mortality from coronary heart disease, stroke, congestive heart failure, and end-stage renal disease.[1,10,11] There is no convincing evidence of a J-shaped relationship or a "threshold" below which the relationship between level of blood pressure and risk of cardiovascular and renal disease is not observed.[12] The association of systolic blood pressure with risk of cardiovascular and renal disease is stronger than the corresponding relationship for diastolic blood pressure.[13] In light of such knowledge, this advisory is primarily focused on systolic blood pressure.

High blood pressure is only one of several proven major modifiable risk factors for cardiovascular disease. In combination, these factors provide a powerful basis for predicting risk and preventing cardiovascular complications in the general population. A recent report of large cohort studies conducted in 366 559 young and middle-aged men and women indicated that persons with a low cardiovascular disease-risk profile (serum cholesterol level <200 mg/dL [5.18 mmol/L], blood pressure $\leq 120/80$ mm Hg, and no current cigarette smoking) have a 72% to 85% lower mortality from cardiovascular disease and a 40% to 58% lower mortality from all causes compared with persons who have 1 or more of 3 modifiable cardiovascular risk factors.[14] The estimated greater life expectancy for the

Figure. Systolic Blood Pressure Distributions



Reduction in BP, mm Hg	% Reduction in Mortality		
	Stroke	CHD	Total
2	−6	−4	−3
3	−8	−5	−4
5	−14	−9	−7

BP indicates blood pressure; CHD, coronary heart disease. Adapted from *Arch Intern Med,*[7] with additional data from Stamler.[16]

low-risk group ranged from 5.8 to 9.5 years. Computer programs and risk-calculating charts are available to assist clinicians and public health workers in determining risk (http://www.nhlbi.nih.gov).[15]

RECOMMENDATIONS

Approaches to Primary Prevention of Hypertension

Hypertension can be prevented by complementary application of strategies that target the general population and individuals and groups at higher risk for high blood pressure. Lifestyle interventions are more likely to be successful, and the absolute reductions in risk of hypertension are likely to be greater when targeted in persons who are older and those who have a higher risk of developing hypertension compared with their counterparts who are younger or have a lower risk. However, prevention strategies applied early in life provide the greatest long-term potential for avoiding the precursors that lead to hypertension and elevated blood pressure levels and for reducing the overall burden of blood pressure–related complications in the community.

Population-Based Strategy

A population-based approach aimed at achieving a downward shift in the distribution of blood pressure in the general population is an important component for any comprehensive plan to prevent hypertension. As shown in the FIGURE, a small decrement in the distribution of systolic blood pressure is likely to result in a substantial reduction in the burden of blood pressure–related illness.[16] In an analysis based on Framingham Heart Study experience, Cook et al[17] reported that a 2-mm Hg reduction in the population average of diastolic blood pressure for white US residents 35 to 64 years of age would result in a 17% decrease in the prevalence of hypertension, a 14% reduction in the risk of stroke and transient ischemic attacks, and a 6% reduction in the risk of coronary heart disease. Public health approaches, such as lowering sodium content or caloric density in the food supply, and providing attractive, safe, and convenient opportunities for exercise are ideal population-based approaches for reduction of average blood pressure in the community. Enhancing access to appropriate facilities (parks, walking trails, bike paths) and to effective behavior change models is a useful strategy for increasing physical activity in the general population.[18]

Intensive Targeted Strategy

More intensive targeted approaches, aimed at achieving a greater reduction in blood pressure in those who are most likely to develop hypertension, complement the previously mentioned population-based strategies for prevention of hypertension. Groups at high risk for hypertension include those with high-normal blood pressure, a family history of hypertension, African American (black) ancestry, overweight or obesity, a sedentary lifestyle, excess intake of dietary sodium, insufficient intake of potassium, or excess consumption of alcohol. Contexts in which intensive targeted interventions can be conducted to prevent hypertension in African Americans and older Americans include health care settings as well as senior centers and faith-based organizations that have blood pressure screening and referral programs.

Interventions With Documented Efficacy

The 1993 recommendations[7] included weight loss, reduced intake of dietary sodium, moderation in alcohol consumption, and increased physical activity as the best proven interventions for prevention of hypertension. Since then, further evidence in support of these recommendations has emerged. In addition, potassium supplementation and modification of eating patterns has been shown to be beneficial in prevention of hypertension. Brief descriptions of the 6 recommended lifestyles with proven efficacy for prevention of hypertension are presented in the BOX. A summary of selected intervention efficacy experience published since 1993 is presented in the following sections.

Weight Loss. A comprehensive review of the evidence supporting the value of modest reductions in body weight is provided in the *Clinical Guidelines for the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*.[19] He et al[20] reported on the experience of 181 normotensive persons who had participated in phase I of the Trials of Hypertension Prevention. During their initial 18 months of active intervention, those assigned to the weight loss group reduced their body weight by 7.7 lb (3.5 kg) and their systolic and diastolic blood pressures by 5.8 and 3.2 mm Hg, respectively. After 7 years of follow-up, the incidence of hypertension was 18.9% in the weight loss group and 40.5% in the control group. These findings suggest that weight loss interventions produce benefits that persist long after the cessation of the active intervention. In phase II of the Trials of Hypertension Prevention, the 595 participants assigned to a weight loss counseling intervention experienced a 21% reduction in hypertension incidence compared with 596 counterparts assigned to usual care.[21] Weight loss participants who were able to lose 9.7 lb (4.4 kg) or more and to sustain this weight loss through the 36-month period of follow-up experienced average reduction in systolic and diastolic blood pressure of 5.0 and 7.0 mm Hg, respectively.[22]

Dietary Sodium Reduction. At least 3 meta-analyses[23-25] of the efficacy of reduced sodium intake in lowering

blood pressure have been published since 1993. In all 3 reports, sodium reduction was associated with a small but significant reduction in systolic blood pressure in normotensive persons. In a meta-analysis of 12 randomized controlled trials conducted in 1689 normotensive participants, Cutler et al[23] estimated that an average reduction of 77 mmol/d in dietary intake of sodium resulted in a 1.9-mm Hg (95% confidence interval [CI], 1.2-2.6 mm Hg) decrement in systolic blood pressure and a 1.1-mm Hg (95% CI, 0.6-1.6 mm Hg) decline in diastolic blood pressure.

In a randomized controlled trial (the Dietary Approaches to Stop Hypertension [DASH]-Sodium Trial) conducted in 412 persons with an average systolic blood pressure of 120 to 159 mm Hg and an average diastolic blood pressure of 80 to 95 mm Hg, a reduction in sodium intake from a high level (mean urinary sodium excretion, 142 mmol/d) to an intermediate level (mean urinary sodium excretion, 107 mmol/d) reduced systolic blood pressure by 2.1 mm Hg ($P<.001$) during consumption of a usual American control diet and by 1.3 mm Hg ($P=.03$) during consumption of a DASH diet that was high in fruits and vegetables and low-fat dairy products.[26] Reducing sodium intake from the intermediate level to a lower level (mean urinary sodium excretion, 65 mmol/d) resulted in an additional reduction in systolic blood pressure of 4.6 mm Hg during consumption of the control diet ($P<.001$) and 1.7 mm Hg reduction during consumption of the DASH diet ($P<.01$). The effects of sodium reduction were greater for those assigned to the typical American diet, compared with those assigned to the DASH diet.[26] These findings are consistent with current national recommendations for a moderately low intake of dietary sodium (no more than 100 mmol/d: approximately 6 g of sodium chloride or 2.4 g of sodium per day) by all Americans[6] and suggest that an even lower level of dietary sodium intake may result in a greater reduction in blood pressure.

Box. Lifestyle Modifications for Primary Prevention of Hypertension

- Maintain normal body weight for adults (body mass index, 18.5-24.9 kg/m^2)
- Reduce dietary sodium intake to no more than 100 mmol/d (approximately 6 g of sodium chloride or 2.4 g of sodium per day)
- Engage in regular aerobic physical activity such as brisk walking (at least 30 minutes per day, most days of the week)
- Limit alcohol consumption to no more than 1 oz (30 mL) of ethanol (eg, 24 oz [720 mL] of beer, 10 oz [300 mL] of wine, or 2 oz [60 mL] of 100-proof whiskey) per day in most men and to no more than 0.5 oz (15 mL) of ethanol per day in women and lighter-weight persons
- Maintain adequate intake of dietary potassium (>90 mmol [3500 mg] per day)
- Consume a diet that is rich in fruits and vegetables and in low-fat dairy products with a reduced content of saturated and total fat (Dietary Approaches to Stop Hypertension [DASH] eating plan[26])

In a large, long-term-community-based randomized controlled trial, Whelton et al[27] reported that a moderate reduction of dietary sodium intake resulted in an additional 4.3-mm Hg reduction in systolic blood pressure among older persons with hypertension whose blood pressures were already well controlled by a single antihypertensive medication. For those assigned to a combined sodium reduction and weight loss intervention, the corresponding additional reduction in systolic blood pressure was 5.5 mm Hg. The need for antihypertensive medication during a subsequent 18-month period of follow-up was reduced by 31% and 53% in those assigned to sodium reduction and combined sodium reduction and weight loss, respectively. Although not directly relevant to prevention of hypertension, the results of this trial provide additional evidence in support of the role of weight loss and moderate sodium reduction as means to reduce blood pressure, even for persons who have been taking antihypertensive medication.

In the NHANES I Epidemiologic Follow-up Study, He et al[28] reported that a 100-mmol higher level of sodium intake in overweight persons was associated with a 32% increase in stroke incidence, an 89% increase in stroke mortality, a 44% increase in coronary heart disease mortality, a 61% increase in cardiovascular disease mortality, and a 39% increase in mortality from all causes. In Finland in a prospective population-based cohort study conducted in 1173 men and 1263 women 25 to 64 years of age, the hazard ratios for coronary heart disease, cardiovascular disease, and all-cause mortality, associated with a 100-mmol higher level of 24-hour urinary sodium excretion, were 1.51 (95% CI, 1.14-2.00), 1.45 (95% CI, 1.14-1.84), and 1.26 (95% CI, 1.06-1.50), respectively.[29] There was a significant interaction between sodium excretion and body mass index for cardiovascular and total mortality, with sodium being a stronger predictor of mortality in men who were overweight. These data support the premise that a lower intake of dietary sodium reduces the risk of subsequent cardiovascular disease, especially in those who are also overweight.

Increased Physical Activity. A meta-analysis by Whelton et al[30] in which the experience of 1108 normotensive persons enrolled in 27 randomized controlled trials was included, identified a 4.04-mm Hg (95% CI, 2.75-5.32) reduction in systolic blood pressure in those assigned to aerobic exercise compared with the control group. The magnitude of the intervention effect appears to be independent of the intensity of the exercise program. In the surgeon general's report on physical activity and health, it is recommended that persons exercise for at least 30 minutes on most, if not all, days of the week.[31]

Moderation of Alcohol Consumption. In a meta-analysis of 15 randomized controlled trials, Xin et al[32] reported that decreased consumption of alcohol (the median reduction in self-reported consumption of alcohol was 76%, with a range from 16%-100%) was associated with a reduction in blood pressure, and that the relationship between reduction in mean percentage of alcohol and decline in blood pressure was dose-dependent.[32] Pooling of the experience of 269 normotensive participants enrolled in 6 randomized controlled trials identified a reduced consumption of alcohol as being associated with a 3.56-mm Hg (95% CI, 2.51-4.61 mm Hg) lower level of systolic blood pressure and a 1.80-mm Hg (95% CI, 0.58-3.03 mm Hg) lower level of diastolic blood pressure.[32] Therefore, it is recommended that alcohol consumption be limited to no more than 1 oz (30 mL) of ethanol (eg, 24 oz [720 mL] of beer, 10 oz [300 mL] of wine, or 2 oz [60 mL] of 100-proof whiskey) per day in most men and to no more than 0.5 oz (15 mL) of ethanol per day in women and lighter-weight persons.

Potassium Supplementation. Clinical trials and meta-analyses indicate that potassium supplementation lowers blood pressure in both hypertensive and normotensive persons. In a meta-analysis of the results from 12 trials with 1049 normotensive participants, Whelton et al[33] reported that potassium supplementation (median, 75 mmol/d) lowered systolic blood pressure by 1.8 mm Hg (95% CI, 0.6-2.9) and diastolic blood pressure by 1.0 mm Hg (95% CI, 0.0-2.1). The effects of potassium supplementation appeared greater in those with higher levels of sodium intake.

Modification of Whole Diets. The DASH and DASH-Sodium trials used dietary interventions that incorporated several nutritional recommendations for lowering blood pressure.[26,34] In the 8-week DASH trial, study participants with a systolic blood pressure of less than 160 mm Hg and a diastolic blood pressure between 80 and 95 mm Hg were randomly assigned to one of the following dietary groups: (1) a control diet that was low in fruits, vegetables, and dairy products, with a fat content typical of the average diet in the United States, (2) a similar diet that was rich in fruits and vegetables, or (3) a DASH diet that was rich in fruits, vegetables, and low-fat dairy products but reduced in saturated and total fat.[35] Among the 326 normotensive DASH participants (blood pressure <140/90 mm Hg), the DASH diet reduced systolic blood pressure by 3.5 mm Hg ($P<.001$).[34]

In a subsequent DASH-Sodium study, normotensive persons assigned to the DASH diet and a low level of urinary sodium excretion (67 mmol/d) reduced their systolic blood pressure by 7.1 mm Hg (7.2 mm Hg for blacks and 6.9 mm Hg for others) compared with counterparts who were assigned to the control diet and a high level of urinary sodium excretion (141 mmol/d).[26] A significant reduction in diastolic blood pressure was also observed. Furthermore, the beneficial effects of the DASH diet and the DASH diet with reduced sodium occurred broadly in all major subgroups of the population.[36]

Interventions With Uncertain or Less Proven Efficacy

Calcium Supplementation. Consistent with previous observations, a recent meta-analysis of randomized controlled clinical trials suggests that calcium supplementation results in only a small reduction in blood pressure.[37] This effect has only been observed in those with hypertension. However, for general health, it is prudent to recommend adequate calcium intake as a component of any diet (1000-1200 mg/d for adults).[38]

Fish Oil Supplementation. Two meta-analyses of clinical trials indicate that supplementation with relatively high doses of omega-3 polyunsaturated fatty acids lowers blood pressure in hypertensive patients, especially in those with untreated hypertension.[39,40] In normotensive persons, however, the effect seems to be small. For example, in a pooled analysis of 11 trials with 728 normotensive participants, Appel et al[39] reported that fish oil supplementation (3.4 g/d) lowered systolic blood pressure by only 1.0 mm Hg (95% CI, 0.0-2.0) and diastolic blood pressure by 0.5 mm Hg (95% CI, –0.2 to 1.2).[39] Adverse effects, including eructation and a fishy taste, were more common in those assigned to fish oil capsules than in their controls. Although evidence for a blood pressure–lowering effect of fish oil is modest, observational epidemiological studies and clinical trials have suggested that an increased intake of fish oil may reduce the risk of coronary heart disease and stroke.[41,42]

Herbal or Botanical Dietary Supplements. There has been considerable increase in the use of herbal products in the United States. Results from the 1998-1999 Slone Survey indicated that about 14% of US adults were taking herbal products.[43] The 10 most commonly used herbal products are ginseng, *Ginkgo biloba* extract, *Allium sativum*, glucosamine, St John's wort, *Echinacea augustifolia*, lecithin, chondroitin, creatine, and *Serenoa repens*.[43] Dietary supplements including herbals do not undergo the same stringent regulatory approval process as drugs. Food and drug laws do not require demonstration of safety and efficacy to support legal marketing of dietary supplements. There is a lack of standardization among brands of supplements, and the bioactive ingredient of products can vary widely.

Few clinical trial reports are available to support the use of herbal and botanical supplements in the prevention or treatment of high blood pressure or heart disease. At a minimum, health care professionals should ask their patients about the use of herbal products and consider the possibility of herb-drug interactions.

PRIMARY PREVENTION IN CHILDREN

There is ample evidence that hypertension begins in childhood. Children with higher than average blood pressure

levels early in life are more likely to develop hypertension later in life. Efforts to prevent blood pressure levels from increasing in childhood are prudent and best accomplished by application of the same lifestyle approaches used to prevent and treat hypertension in adults.[44]

Accordingly, school administrators are encouraged to examine their lunch menus and promote the use of heart-healthy foods. Parents are encouraged to read food labels and make wise choices for lunches prepared at home. In addition, school curricula should include health education programs that promote increased physical activity and other healthy lifestyles aimed at prevention of cardiovascular and other chronic diseases.

ADDITIONAL RESEARCH

Further strengthening of the science that underpins strategies for implementation and maintenance of hypertension prevention strategies is warranted. Some of the most pressing needs include (1) attaining a better understanding of physical and behavioral factors that influence blood pressure during growth and development, (2) gaining additional knowledge of the efficacy and effectiveness of specific dietary interventions, such as increased dietary protein or dietary fiber intake, and other modifications of whole diets in the prevention of hypertension, (3) testing alternative strategies for implementation of nonpharmacologic interventions, including nutrition education, in clinical and community settings, (4) enhancing the capacity to change general environmental exposures to diet and exercise in a favorable manner by working with the food industry and planning agencies, (5) identifying and testing culturally specific approaches for hypertension prevention, (6) maintaining a strong program of behaviorally focused research to strengthen the empirical base of educational interventions, and (7) characterizing phenotypic and genetic predictors of response to interventions for prevention of hypertension in an individual and/or group.

BARRIERS TO IMPROVEMENT

Cultural norms, insufficient attention to health education and lack of referral to registered dietitians, economic disincentives to healthier lifestyles, lack of reimbursement for hypertension prevention counseling services by third-party payers, and other barriers to prevention of hypertension continue to impede progress. For example, economic disincentives to healthier lifestyles include higher prices for low-sodium products and lower unit pricing for larger portions. To overcome this barrier, professional associations and policy developers should work with the food industry to increase availability of lower-sodium food products and to provide educational programs for consumers regarding portion size and heart-healthy food choices. In addition, insufficient attention to health education, including nutrition education, by health care providers, school systems, and public health and voluntary associations is an impediment to progress.

SUMMARY

A combination of increased physical activity, moderation in alcohol intake, and consumption of a diet that is lower in sodium content and higher in fruits, vegetables, and low-fat dairy products than the average American diet represents the best approach for preventing high blood pressure in the general population and in high-risk groups. The demonstrated reductions in blood pressure using lifestyle changes can be as large as those seen in drug studies, can occur in virtually all subgroups of the population, and can be sustained over a long period of time (more than 3 years).

Additional education of health care professionals and the general public, enhanced means of support for those attempting to change their lifestyles, and policies aimed at reducing the burden in complying with the recommendations for nonpharmacologic reductions in blood pressure are essential elements for any national program aimed at prevention of hypertension. Given that sodium added during processing of foods accounts for approximately three quarters of an individual's total sodium intake, any meaningful reduction in sodium intake is predicated on a decrease in dietary sodium from food sources.[45] This could be achieved by gradually reducing the amount of sodium added during processing and by greater availability and promotion of foods with a lower sodium content. Reduction in discretionary salt intake at the table and during cooking is desirable but unlikely to have a major impact on dietary sodium intake in most persons.

Despite the acknowledged challenges to implementing these recommendations, the potential for health benefits makes continued efforts to achieve prevention of hypertension an important national objective.

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The NHBPEP Coordinating Committee Includes Representatives From the Following Member Organizations: American Academy of Family Physicians; American Academy of Insurance Medicine; American Academy of Neurology; American Academy of Ophthalmology; American Academy of Physician Assistants; American Association of Occupational Health Nurses; American College of Cardiology; American College of Chest Physicians; American College of Occupational and Environmental Medicine; American College of Physicians-American Society of Internal Medicine; American College of Preventive Medicine; American Dental Association; American Diabetes Association; American Dietetic Association; American Heart Association; American Hospital Association; American Medical Association; American Nurses Association; American Optometric Association; American Osteopathic Association; American Pharmaceutical Association; American Podiatric Medical Association; American Public Health Association; American Red Cross; American Society of Health-System Pharmacists; American Society of Hypertension; Association of Black Cardiologists; Citizens for Public Action on High Blood Pressure and Cholesterol, Inc; International Society on Hypertension in Blacks; National Black Nurses Association, Inc; National Hypertension Association, Inc; National Kidney Foundation, Inc; National Medical Association; National Optometric Association; National Stroke Association; NHLBI Ad Hoc Committee on Minority Populations; Society of Geriatric Cardiology; Society for Nutrition Education. *Federal Agencies:* Agency for Healthcare Research and Quality; Department of Veterans Affairs; Centers for Medicare and Medicaid Services; Health Resources and Services Administration; National Center for Health Statistics, Centers for Disease Control and Prevention; National Heart, Lung, and Blood Institute; National Institute of Diabetes and Digestive and Kidney Diseases.

Scheme Used for Classification of the Evidence

M Meta-analysis; use of statistical methods to combine the results from clinical trials

Ra Randomized controlled trials; also known as experimental studies

Re Retrospective analyses; also known as case-control studies

F Prospective study; also known as cohort studies, including historical or prospective follow-up studies.

X Cross-sectional survey; also known as prevalence studies

Pr Previous review or position statements

C Clinical interventions (nonrandomized)

To provide information on the evidence category for articles in this report, these symbols are appended to the citations in the reference list.

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