Lifestyle Management of Hypertension and Dyslipidemia

Adam Bernstein, MD ScD
Director of Research, Wellness Institute
Cleveland Clinic

The New England Journal of Medicine

PRIMARY PREVENTION OF CORONARY HEART DISEASE IN WOMEN THROUGH DIET AND LIFESTYLE
MER J. STAMPER, M.D., FRANK B. HU, M.D., JOANNE E. MANSON, M.D., ERIC B. Rimm, Sc.D., AND WALTER C. WILLETT, M.D.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PERCENTAGE OF WOMEN IN GROUP</th>
<th>NO. OF CORONARY HEART DISEASE EVENTS</th>
<th>RELATIVE RISK (95% CI)</th>
<th>POPULATION ATTRIBUTABLE RISK (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three low-risk factors</td>
<td>12.7%</td>
<td>68</td>
<td>0.43 (0.33–0.55)</td>
<td>54 (42–64)</td>
</tr>
<tr>
<td>Diet score in upper 2 quintiles</td>
<td>Non-smoking</td>
<td>Moderate-to-vigorous exercise ≥30 min/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four low-risk factors</td>
<td>7.2%</td>
<td>24</td>
<td>0.34 (0.23–0.52)</td>
<td>64 (46–70)</td>
</tr>
<tr>
<td>Diet score in upper 2 quintiles</td>
<td>Non-smoking</td>
<td>Moderate-to-vigorous exercise ≥30 min/day</td>
<td></td>
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</tr>
<tr>
<td>Body-mass index &lt;25</td>
<td>3.1%</td>
<td>5</td>
<td>0.17 (0.07–0.41)</td>
<td>42 (58–95)</td>
</tr>
<tr>
<td>Five low-risk factors</td>
<td>Diet score in upper 2 quintiles</td>
<td>Non-smoking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate-to-vigorous exercise ≥30 min/day</td>
<td>Body-mass index &lt;25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol ≥5 g/day</td>
<td></td>
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</table>
TABLE 3. RISK OF CORONARY EVENTS IN LOW-RISK GROUPS DEFINED ACCORDING TO DIFFERENT CONSTITUENCIES OF ADJUSTABLE RISK FACTORS FOR CORONARY DISEASE AMONG CURRENT NONSMOKERS IN THE NURSES’ HEALTH STUDY, 1980 TO 1994.*

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PERCENTAGE OF WOMEN IN GROUP</th>
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<th>POPULATION ATTRIBUTABLE RISK (95% CI)</th>
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<tbody>
<tr>
<td>Two low-risk factors§</td>
<td>16.4</td>
<td>62</td>
<td>0.68 (0.52–0.88)</td>
<td>28 (10–44)</td>
</tr>
<tr>
<td>Det score in upper 2 quintiles</td>
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<td></td>
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<td></td>
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<tr>
<td>Moderate-to-vigorous exercise &gt;30 min/day</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Three low-risk factors§</td>
<td>9.4</td>
<td>24</td>
<td>0.54 (0.36–0.82)</td>
<td>45 (17–62)</td>
</tr>
<tr>
<td>Det score in upper 2 quintiles</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate-to-vigorous exercise &gt;30 min/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body mass index &lt;25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four low-risk factors</td>
<td>4.0</td>
<td>5</td>
<td>0.25 (0.10–0.66)</td>
<td>74 (59–90)</td>
</tr>
<tr>
<td>Det score in upper 2 quintiles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
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<td></td>
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</tbody>
</table>

AHA Scientific Statement

Dietary Approaches to Prevent and Treat Hypertension
A Scientific Statement From the American Heart Association

Lawrence J. Appel, MD, MPH; Michael W. Brands, PhD; Stephen R. Daniels, MD, PhD; Njeri Karanja, PhD; Patricia J. Elmer, PhD; Frank M. Sacks, MD

Figure 1. Estimated effects of population-wide shifts in systolic BP distributions on mortality. Adapted with permission from Stamler.12
Outline

- Current lifestyle management recommendations for hypertension and dyslipidemia
- Any role for supplements in management of hypertension or dyslipidemia?
- What’s new in the field of lifestyle management for hypertension and dyslipidemia?

- Summary

Current lifestyle management recommendations for hypertension and dyslipidemia
Hypertension

- Eat a better diet, which may include reducing salt
- Enjoy regular physical activity
- Maintain a healthy weight
- Manage stress
- Avoid tobacco smoke
- If you drink, limit alcohol

Adopting a healthy lifestyle is critical for the prevention of high blood pressure and an indispensable part of managing it. Enhance the effectiveness of blood pressure medications.

Myth: Hypertension cannot be controlled.

Fact: Hypertension is easily detected and usually controllable. Making certain lifestyle modifications and taking medication as prescribed are the keys to controlling hypertension. Behavioral changes include losing excess weight, quitting smoking, getting regular exercise, and eating a low-fat and low-salt diet. However, even with such behavioral changes, high blood pressure can still persist. Medication in conjunction with moderate lifestyle alterations is usually necessary to achieve the desired goal of below 140/90 mm Hg.
**Lifestyle changes**

- Don’t smoke cigarettes or use any tobacco products.
- Lose weight if you’re overweight.
- Exercise regularly.
- Eat a healthy diet that includes lots of fruits and vegetables and is low in fat.
- Limit your sodium, alcohol, and caffeine intake.
- Try relaxation techniques or biofeedback.

**AHA Scientific Statement**

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<table>
<thead>
<tr>
<th>TABLE 1. Diet-Related Lifestyle Modifications That Effectively Lower BP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lifestyle Modification</strong></td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Weight loss</td>
</tr>
<tr>
<td>Reduced salt intake</td>
</tr>
<tr>
<td>DASH-type dietary patterns</td>
</tr>
<tr>
<td>Increased potassium intake</td>
</tr>
<tr>
<td>Moderation of alcohol intake</td>
</tr>
</tbody>
</table>
Dyslipidemia

- Vegetables, fruits, and whole grains
- Low-fat dairy products, poultry, fish, legumes, nontropical vegetable oils, and nuts
- Limit intake of sweets, sugar-sweetened beverages, and red meats
- Adapt this dietary pattern to appropriate calorie requirements, personal and cultural food preferences, and nutrition therapy for other medical conditions (including diabetes) ... may achieve through DASH, USDA food pattern, or AHA diet
- Limit saturated and trans fats
- Exercise 40 min of moderate-intense physical activity 3-4 times per week


Any role for supplements in management of hypertension or dyslipidemia?
Supplements and Hypertension

All of uncertain benefit...

- Fish Oil (may occur w/ ≥ 3 g/day), 4.0/2.5 reduction
- Fiber (avg, 14 g/day) associated with 1.6/2.0 reduction
- Calcium (400-2000mg/day) associated with ~ 1.0/0.5 reduction
- Magnesium?
- Vitamin C?

Hypertension. 2006; 47: 298-308
## Supplements and High Cholesterol

<table>
<thead>
<tr>
<th>Cholesterol-lowering supplement</th>
<th>What it does</th>
<th>Side effects and drug interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artichoke extract</td>
<td>May reduce total cholesterol and LDL, or “Bad,” cholesterol</td>
<td>May cause gas or an allergic reaction</td>
</tr>
<tr>
<td>Barley</td>
<td>May reduce total cholesterol and LDL cholesterol</td>
<td>None</td>
</tr>
<tr>
<td>Beta-sitosterol (found in oral supplements and some margarines, such as Promise Activ)</td>
<td>May reduce total cholesterol and LDL cholesterol</td>
<td>May cause nausea, indigestion, gas, diarrhea or constipation. May be ineffective if you take statins (Zetia), a prescription cholesterol medication</td>
</tr>
<tr>
<td>Blond psyllium (found in seed husk and products such as Metamucil)</td>
<td>May reduce total cholesterol and LDL cholesterol</td>
<td>May cause gas, stomach pain, diarrhea, constipation or nausea</td>
</tr>
<tr>
<td>Fish oil (found as a liquid oil and in oil-filled capsules)</td>
<td>May reduce triglycerides</td>
<td>May cause a fishy aftertaste, bad breath, gas, nausea, vomiting or diarrhea. May interact with some blood-thinning medications, such as warfarin (Coumadin)</td>
</tr>
<tr>
<td>Flaxseed, ground</td>
<td>May reduce triglycerides</td>
<td>May interact with some blood-thinning medications, such as aspirin, clopidogrel (Plavix) and warfarin (Coumadin)</td>
</tr>
<tr>
<td>Garlic extract</td>
<td>May reduce total cholesterol, LDL cholesterol and triglycerides</td>
<td>May cause bad breath, body odor, heartburn, gas, nausea, vomiting or diarrhea. May interact with blood-thinning medications, such as warfarin (Coumadin)</td>
</tr>
<tr>
<td>Green tea extract</td>
<td>May lower LDL cholesterol</td>
<td>May cause nausea, vomiting, gas or diarrhea. May interact with blood-thinning medications, such as warfarin (Coumadin)</td>
</tr>
<tr>
<td>Oat bran (ground in unrefined and whole and cut)</td>
<td>May reduce total cholesterol and LDL cholesterol</td>
<td>May cause gas or bloating</td>
</tr>
<tr>
<td>Sitostanol (found in oral supplements and some margarines, such as Benecol)</td>
<td>May reduce total cholesterol and LDL cholesterol</td>
<td>May cause diarrhea</td>
</tr>
</tbody>
</table>

Mayo Clinic, 2014
What’s new in the field of lifestyle management for hypertension and dyslipidemia?

Stress Reduction
REVIEW

Does psychosocial stress cause hypertension? A systematic review of observational studies

F Sparrenberger1, PT Cichero2, AM Ascoli3, FP Fonseca1, G Weiss3, O Berwanger3, SC Fuchs4, LB Moreira4 and FD Fuchs4

1Department of Medicine, Universidade Regional do Blumenau, Blumenau, Brazil; 2Division of Cardiology, Hospital de Clínicas de Porto Alegre, Porto Alegre, Rio Grande do Sul, Brazil; 3Hospital dos Cocais, São Paulo, Brazil; 4Department of Social Medicine, Universidade Federal do Rio Grande do Sul, Rio Grande do Sul, Brazil and 5Division of Clinical Pharmacology, Hospital de Clínicas de Porto Alegre, Universidade Federal do Rio Grande do Sul, Rio Grande do Sul, Brazil

Acute stress promotes transient elevation of blood pressure, but there is no consistent evidence that this effect causes hypertension. In this systematic review of cohort and case–control studies that investigated the association between psychosocial stress and hypertension, we conducted a computer search up to February 2007 in MEDLINE, EMBASE, PSYCNFO and Lilacs, through a search strategy that included eight terms to describe the exposure, risk related to the design of the studies and one term for outcome. The quality was assessed by the Newcastle-Ottawa Quality Assessment Scale. The quality was blinded among independent reviewers. Among 82 studies selected for inclusion in the second phase, only 14 (10 cohort studies and 2 case–control studies), totaling 52 049 individuals, fulfilled the selection criteria. The average quality of the studies was 6.6 ± 1.3 in a 9-point scale. Acute life events were associated with hypertension in one and were not associated in two studies. Five out of seven studies found a significant and positive association between measures of chronic stress and hypertension, with risk ratios ranging from 1.0 to 1.1. Three out of five studies reported high and significant risks of affective response to stress for hypertension, one a significant risk close to a unit and one reported absence of risk. Acute stress is probably not a risk factor for hypertension. Chronic stress and particularly the non-adaptive response to stress (coherence, emotional exhaustion) may impact on chronic elevation of blood pressure. Studies with better quality are warranted.

Journal of Human Hypertension (2009) 23, 12–19
doi:10.1088/0954-382X/23/7/008, published online 10 July 2008

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### Study (n) OR CI 95%

#### Case–control

**Acute**
- Rat 2005**a**
  - (205 men)
  - (179 women)
  - (3.20-8.57)
  - (0.50-8.80)
- Chronic
  - Suvait 1994**b**
  - (196)
  - (2.63)
  - (1.20-7.16)
  - (1.25-11.0)
- Affective-response
  - Perez 2001**c**
  - (498)
  - (5.52)
  - (2.25-11.1)
  - (3.23-31.7)

#### Cohort

**Acute**
- Potts 1981**d**
  - (121)
  - (1.60)
- Domin 1995**e**
  - (198)
  - (1.49)
  - (1.09-2.02)
- Chronic
  - Kario`1982**f**
  - (568)
  - (1.62)
  - (1.50-1.76)
  - (1.37-5.74)
  - (0.97-4.26)
- Affective-response
  - Saperas 1992**g**
  - (118)
  - (1.09)
  - (1.04-1.17)
  - (1.10-1.30)

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**Odds ratio 0.5 1.0 2.0 4.0 8.0 16.0**
Stress Reduction Programs in Patients with Elevated Blood Pressure: A Systematic Review and Meta-analysis

Maxwell V. Rainforth, PhD, Robert H. Schneider, MD, Sanford I. Natch, EdD, Carolyn Gaylord-King, PhD, John W. Selerno, PhD, and James W. Anderson, MD

Abstract

Substantial evidence indicates that psychosocial stress contributes to hypertension and cardiovascular disease (CVD). Previous meta-analyses of stress reduction and high blood pressure (BP) were outdated and/or methodologically limited. Therefore, we conducted an updated systematic review of the published literature and identified 107 studies on stress reduction and BP. Seventeen trials with 27 treatment comparisons and 960 participants with elevated BP met criteria for well-designed randomized controlled trials and were replicated within intervention categories. Meta-analysis was used to calculate BP changes for biofeedback, −0.65–0.20 mm Hg (P = NS); relaxation-assisted biofeedback, −4.30–4.4 mm Hg (P = NS); progressive muscle relaxation, −3.00–1.4 mm Hg (P = NS); stress management training, −2.30–1.3 mm (P = NS), and the Transcendental Meditation program, −9.00–2.8 mm Hg (P = 0.0025). Available evidence indicates that among stress reduction approaches, the Transcendental Meditation program is associated with significant reductions in BP. Related data suggest improvements in other CVD risk factors and clinical outcomes.
Sleep


INSOMNIA AND HYPERTENSION

Insomnia with Objective Short Sleep Duration is Associated with a High Risk for Hypertension

Alexandros N. Vgontzas, MD; Duanqing Liao, PhD; Edward O. Bixler, PhD; George P. Chrousos, MD; Antonio Vela-Bueno, MD

1Sleep Research and Treatment Center, Department of Psychiatry, Pennsylvania State University College of Medicine, Hershey, PA; 2Department of Public Health Sciences, Pennsylvania State University College of Medicine, Hershey, PA; 3First Department of Pediatrics and Unit on Endocrinology, Metabolism and Diabetes, University of Athens, Athens, Greece; 4Department of Psychiatry, School of Medicine, Autonomous University, Madrid, Spain

Study Objectives: To examine the joint effect of insomnia and objective short sleep duration on hypertension risk.

Design: Representative cross-sectional study.

Setting: Sleep laboratory.

Participants: 1,741 men and women randomly selected from central Pennsylvania.

Interventions: None.

Measurements: Insomnia was defined by a complaint of insomnia with a duration ≥ 1 year, while poor sleep was defined as a complaint of difficulty falling asleep, staying asleep, or early awakening. Polysomnographic sleep duration was classified into 3 categories ≥ 6 h sleep (top 50% of the sample), 5-6 h (approximately the third quartile of the sample); and ≤ 5 h (approximately the bottom quartile of the sample). Hypertension was defined based either on blood pressure measures or treatment. We controlled for age, race, sex, body mass index, diabetes, smoking, alcohol use, depression, sleep disordered breathing (SDB), and sampling weight.

Results: Compared to the normal sleeping and ≥ 6 h sleep duration group, the highest risk of hypertension was in insomnia with ≤ 5 h sleep duration group (OR [95% CI] 5.1 [2.2, 11.8]), and the second highest in insomnia who slept 5-6 hours (OR 3.5 [1.6, 7.9] P < 0.01). The risk for hypertension was significantly higher, but of lesser magnitude, in poor sleepers with short sleep duration.

Conclusions: Insomnia with short sleep duration is associated with increased risk of hypertension, to a degree comparable to that of other common sleep disorders, e.g., SDB. Objective sleep duration may predict the severity of chronic insomnia a prevalent condition whose medical impact has been apparently underestimated.

Keywords: Insomnia, objective sleep duration, hypertension

Citation: Vgontzas AN; Liao D, Bixler EO; Chrousos GP; Vela-Bueno A. Insomnia with objective short sleep duration is associated with a high risk for hypertension. SLEEP 2009;32(4):497-497.
# Beans

**Effect of Dietary Pulses on Blood Pressure: A Systematic Review and Meta-analysis of Controlled Feeding Trials**

Vilanda H. Jayalath,1,2 Russell J. de Souza,3,4 John L. Sievenpiper,4,6 Vanessa Ha,5,7 Laura Chiavaroli,1,2 Arash Mirahmadi,8,9 Marco Di Buono,1 Adam M. Bernstein,6,7 Lawrence A. Leiten,1,2,8,9 Penny M. Kris-Etherton,10 Vladimir Yukan,11 Joseph Beyene,12 Cyril W.C. Kendall,12,13 and David J.A. Jenkins1,2,14

## BACKGROUND

Current guidelines recommend diet and lifestyle modifications for primary prevention and treatment of hypertension, but do not encourage dietary pulses specifically for lowering blood pressure (BP). To quantify the effect of dietary pulses interventions on BP and provide evidence for their inclusion in dietary guidelines, a systematic review and meta-analysis of controlled feeding trials was conducted.

## METHODS

MEDLINE, EMBASE, Cochrane library, and CENTRAL were each searched from inception through May 2014. Manuscripts of 6 weeks that reported data for systolic, diastolic, and/or mean arterial BP were included. Two reviewers independently extracted data and assessed methodological quality and risk of bias for included studies. Effect estimates were pooled using random-effects models, and assessed as mean differences (MD) with 95% confidence intervals (CI). Heterogeneity was assessed (X² test and quantified).²³

## RESULTS

Eight randomized trials (n = 519 participants with and without hypertension) were included in the analysis. Dietary pulses, exchanged isocalorically for other foods, significantly lowered systolic MD = -1.25 mm Hg (95% CI: -2.52 to -0.02, P = 0.04), and mean arterial BP MD = -0.75 mm Hg (95% CI: -1.44 to -0.06, P = 0.03), and diastolic BP nonsignificantly (MD = -0.51 mm Hg (95% CI: -1.24 to 0.21), P = 0.17). Heterogeneity was significant for all outcomes.

**CONCLUSIONS**

Dietary pulses significantly lowered BP in people with and without hypertension. Higher-quality large-scale trials are needed to support these findings.

**CLINICAL TRIAL REGISTRATION**

NCT01946957

Appended blood pressure dietary pulses: hypertension, legumes; meta-analysis guidelines.

doi:10.1016/j.aphp.2015

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### Table: Effect of Dietary Pulses on Blood Pressure

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants (n)</th>
<th>Study Weight, %</th>
<th>Mean Difference (95% CI)</th>
<th>Mean Difference (95% CI)</th>
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<tbody>
<tr>
<td>2.1 Systolic Blood Pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abyorkara 2012</td>
<td>82</td>
<td>13.50</td>
<td>2.00 [1.00, 3.00]</td>
<td></td>
</tr>
<tr>
<td>Beati 2011</td>
<td>93</td>
<td>18.60</td>
<td>-1.30 [-2.36, -0.24]</td>
<td></td>
</tr>
<tr>
<td>Groz 2010</td>
<td>115</td>
<td>12.60</td>
<td>1.60 [1.75, 4.87]</td>
<td></td>
</tr>
<tr>
<td>Hermanns 2011</td>
<td>10</td>
<td>7.70</td>
<td>-6.00 [-11.67, -0.32]</td>
<td></td>
</tr>
<tr>
<td>Jenkins 2012</td>
<td>121</td>
<td>24.90</td>
<td>-4.50 [-7.61, -1.39]</td>
<td></td>
</tr>
<tr>
<td>Lee 2009</td>
<td>74</td>
<td>14.80</td>
<td>-3.00 [-5.57, -0.43]</td>
<td></td>
</tr>
<tr>
<td>Vemmera 2010</td>
<td>21</td>
<td>9.50</td>
<td>-1.60 [-6.19, 2.99]</td>
<td></td>
</tr>
<tr>
<td>Total [95% CI]</td>
<td>554</td>
<td>100.00</td>
<td>-2.25 [-4.42, -0.08]</td>
<td></td>
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<tr>
<td>Heterogeneity: $I^2 = 77%$ (P = 0.0006)</td>
<td></td>
<td></td>
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<tr>
<td>Test for overall effect: $P = 0.03$</td>
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<tr>
<td>2.2 Diastolic Blood Pressure</td>
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<tr>
<td>Abate 2009</td>
<td>18</td>
<td>2.50</td>
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</tr>
<tr>
<td>Beati 2011</td>
<td>93</td>
<td>20.70</td>
<td>-1.00 [-1.84, -0.16]</td>
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<tr>
<td>Groz 2010</td>
<td>115</td>
<td>10.30</td>
<td>0.18 [-2.23, 2.59]</td>
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<tr>
<td>Hermanns 2011</td>
<td>30</td>
<td>15.50</td>
<td>-2.00 [-3.34, -0.68]</td>
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<tr>
<td>Jenkins 2012</td>
<td>121</td>
<td>14.40</td>
<td>-3.10 [-4.41, -1.79]</td>
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</tr>
<tr>
<td>Total [95% CI]</td>
<td>554</td>
<td>100.00</td>
<td>-0.71 [-1.74, 0.31]</td>
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<tr>
<td>Heterogeneity: $I^2 = 58%$ (P = 0.02)</td>
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</tr>
<tr>
<td>Test for overall effect: $P = 0.17$</td>
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</tbody>
</table>
RESEARCH

Effect of dietary pulse intake on established therapeutic lipid targets for cardiovascular risk reduction: a systematic review and meta-analysis of randomized controlled trials

Vanessa Ha MSc, John L. Steenvanger MD PhD, Ruxell J. de Souza SGS, Viandra H. Jayalah HBS,
Arash Mirmotlagh MSc, Arvinder Aryanwal , Laura Chiavaroli MSc, Sorina Bhanco Mejia MD, Frank M. Sacks MD,
Marco Di Buono PhD, Adam M. Bernstein MD ScD, Lawrence A. Leiter MD, Penny M. Kry-Etherton PhD,
Vladimír Vlkašek PhD, Richard P. Bazinet PhD, Robert G. Jie Jie MBBBS, Joseph Bayene PhD,
Cyril W.C. Kendall PhD, David J.A. Jenkins MD DFCS

ABSTRACT

Background: Evidence from controlled trials endorsing the intake of dietary pulses (beans, chickpeas, lentils and peas) as a method of improving dyslipidaemia, but heart health guidelines have stopped short of articulating specific benefits to this type of intervention or have raised the beneficial evidence as low. We conducted a systematic review and meta-analysis of randomized controlled trials (RCTs) to assess the effect of dietary pulse intake on established therapeutic lipid targets for cardiovascular risk reduction.

Methods: We searched electronic databases and bibliographies of selected trials for relevant articles published through Feb 5, 2014. We included RCTs of at least 3-week duration that compared a diet emphasizing dietary pulse intake with an isocaloric diet that did not include dietary pulses. The lipid targets were: total cholesterol, apolipoprotein B and non-HDL-cholesterol. We pooled data using a random-effects model.

Results: We identified 26 RCTs (n = 1357) that satisfied the inclusion criteria. Diets emphasizing dietary pulse intake at a median dose of 180 g/day (about 1 tinned can) significantly lowered LDL cholesterol levels compared with the control diet (mean difference –0.17 mmol/L, 16% confidence interval –0.25 to –0.09 mmol/L). Treatment effects on apolipoprotein B and non-HDL-cholesterol were not observed.

Interpretation: Our findings suggest that dietary pulse intake significantly reduces LDL cholesterol levels. Trials of longer duration and higher quality are needed to verify these results. Trial registration: ClinicalTrials.gov.

CLINICAL INVESTIGATION

Effects of a Dietary Portfolio of Cholesterol-Lowering Foods vsLovastatin on Serum Lipids and C-Reactive Protein

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Context: To enhance the effectiveness of diet in lowering cholesterol, recommendations of the Adult Treatment Panel III of the National Cholesterol Education Program emphasize diets low in saturated fat combined with plant sterols and stanols, and the American Heart Association supports the use of soy protein and nuts.

Objective: To determine whether a diet containing all of these recommended food components leads to cholesterol reduction comparable to that of statins.

Design: Randomized controlled trial conducted between October and December 2002.

Setting and Participants: Forty-six healthy, hyperlipidemic adults (22 men and 24 postmenopausal women) with a mean (SD) age of 56 (17) years and body mass index of 37 (6) kg/m², recruited from a Canadian hospital-affiliated research center and the community.

Interventions: Participants were randomly assigned to undergo 1 of 3 interventions, on an uncontrolled basis for 1 month, a diet very low in saturated fat, based on a modified whole-wheat bread and low-fat dairy foods (n = 16; controls), the same diet plus blueberries, 250g/d (n = 16), or a diet high in plant sterols (1.5 g/1000 kcal), soy protein and nuts (n = 13), and almonds (15 g/1000 kcal) low in dietary fat.

Main Outcome Measures: Lipid and C-reactive protein levels, obtained from fasting morning blood samples and body weight, measured at weeks 0 and 6.

10/20/2014
**Association between statin use and serum cholesterol concentrations is modified by whole-grain consumption: NHANES 2003–2006**

Huiwen Wang, Alice H. Lichtenstein, Stephanie Lamma-Foro, and Paul J. F. Jacques

**Abstract**

Background: Statins are used to lower cardiovascular disease risk in part because of their effects on plasma lipid profiles. Dietary whole grains have been reported to improve plasma lipid profiles. Little is known about potential interactions between statin use and whole grains.

Objectives: We aimed to assess the interaction between statin use and whole-grain intake in relation to serum lipid concentrations in adults.

Design: In this cross-sectional study, we used data from 4,384 adults aged 40–79 y with reliable and complete dietary data who were participating in the NHANES 2003–2006. Usual whole-grain intake was estimated from two 24-h diet recalls by using the MyPyramid Equivalents Database. Participants self-reported statin use. Total cholesterol and HDL cholesterol concentrations were measured in all adults. The non-HDL cholesterol concentration and total cholesterol-HDL cholesterol ratio were calculated. Multiple linear and logistic regression models were used for analyses.

Results: Statin use was 2,498 in all participants (n = 3,365), and 31.6% of participants (n = 1,357) consumed ≥16 g whole grain/day. After adjustment for demographic and lifestyle factors, the non-HDL-cholesterol concentration was significantly lower in statin users than in non-users. This difference was greater in participants who consumed ≥16 g whole grain/day (difference: 3.17 mg/dL, **P < 0.001**) than in those who consumed <16 g whole grain/day (difference: 0.0 mg/dL, **P = 0.96**). Significant interactions were also observed between statin use and statins use in relation to the total cholesterol-HDL cholesterol ratio.

**Chocolate**

**Effects of Low Habitual Cocoa Intake on Blood Pressure and Bioactive Nitric Oxide**

A Randomized Controlled Trial

Dirk Taubert, MD, PHD
Brianna Ross, PHD
Charles Lemberg, MD
Norma Jorg, MD
Edgar Schmugl, MD

**Design, Setting, and Participants**: Randomized, controlled investigation. Included 30 healthy adults aged 18–40 years with stage 1 hypertension with no lifestyle-modifiable risk factors. The trial was conducted at a primary care center in Germany between January 2004 and December 2005.

**Intervention**: Participants were randomly assigned to receive for 10 weeks either 0.9 g [40 kcal] of dark chocolate containing 20 mg of polyphenols or matching polyphenol-free white chocolate.

**Main Outcome Measures**: Primary outcome measures were change in SBP after 10 weeks. Secondary outcome measures were changes in plasma markers of vascular function, markers of endothelial and inflammatory stress in glomeruli, and solubility of plasma products.

**Results**: From baseline to 10 weeks, dark chocolate intake reduced mean SBP (95% confidence interval [CI]) by 1.95 (0.44–3.46) and diastolic BP by −0.32 (−1.20 to 0.55) mm Hg. Intention-to-treat analysis showed that SBP and diastolic BP decreased significantly by 2.52 (−3.92 to −1.12) and 1.04 (−1.90 to 0.82) mm Hg, respectively. No changes occurred in body weight, plasma levels of triglycerides, and C-reactive protein.

**Conclusion**: Dark chocolate safely and effectively reduces blood pressure in adults with above optimal BP values, which includes a part of small amounts of polyphenolic rich dark chocolate in a modulated diet sufficiently reduced BP and improved markers of vascular function.
Salt

The NEW ENGLAND JOURNAL OF MEDICINE

Association of Urinary Sodium and Potassium Excretion with Blood Pressure

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ABSTRACT

BACKGROUND

Higher levels of sodium intake are reported to be associated with higher blood pressure. Whether this relationship holds for levels of sodium and potassium intake and in different populations is unknown.

METHODS

We studied 10,276 adults from 36 countries. Intakes of urinary sodium and potassium excretion were assessed in a single fasting morning urine specimen and are an accurate reflection of daily intake. We assessed the association between dietary excretion and blood pressure, as measured with an automated device.

RESULTS

Regression analysis showed increases of 0.11 mmol per day in urinary sodium and 0.37 mmol per day on potassium excretion were associated with higher blood pressure. The slope of this association was steeper with higher sodium.

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Urinary Sodium and Potassium Excretion, Mortality, and Cardiovascular Events

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ABSTRACT

BACKGROUND

The optimal range of sodium intake for cardiovascular health is controversial.

METHODS

We obtained morning fasting urine samples from 101,845 persons in 17 countries and estimated 24-hour sodium and potassium excretion (and as a surrogate for intake). We examined the association between estimated urinary sodium and potassium excretion and the composite outcome of death and major cardiovascular events.

RESULTS

The mean estimated sodium and potassium excretion was 4.91 g per day and 2.12 g per day.
Global Sodium Consumption and Death from Cardiovascular Causes


ABSTRACT

We collected data on sodium intake as determined by dietary surveys and diet in persons from 123 countries (representing 75% of adults throughout the world) and used these data to quantify the global consumption of sodium according to age, sex, and country. The effects of sodium on blood pressure, according to age, sex, and the presence or absence of hypertension, were estimated from data in a new meta-analysis of 207 randomized interventions, and the effects of blood pressure on cardiovascular mortality, according to age, were calculated from a meta-analysis of others. Cause-specific mortality was derived from the Global Burden of Disease Study 2010. Using comparative risk assessment, we estimated the cardiovascular effects of current sodium intake, as compared with a reference intake of 2.8 g of sodium per day, according to age, sex, and country.

RESULTS

Salt

Major dietary guidelines

- < 1200 mg/d: UK National Institute for Health and Clinical Excellence, 2025 target
- < 1500 mg/d: American Heart Association
- < 1500 mg/d: US Dietary Guidelines Advisory Committee
- < 2300, < 1500 mg/d*: US Dietary Guidelines for Americans
- < 2400 mg/d: UK Food Standards Agency
- < 2000 mg/d: World Health Organization
Vegetarian Diets and Blood Pressure
A Meta-analysis

OBJECTIVES: Previous studies have suggested an association between vegetarian diets and lower blood pressure (BP), but the relationship is not well established.

METHODS: A systematic review and meta-analysis of controlled clinical trials and observational studies that have examined the association between vegetarian diets and BP were conducted.

RESULTS: Of the 329 studies identified, 3 clinical trials and 32 observational studies met the inclusion criteria. The 7 control/outcome groups of 38 participants (mean age, 44 years) found that consumption of vegetarian diets was associated with a reduction in mean systolic BP (p < 0.05).

Well

Advice From a Vegan Cardiologist

Dr. Kim A. Williams, the president-elect of the American College of Cardiologists, often sees patients who are overweight and struggling with hypertension, type 2 diabetes, and high cholesterol. One of the things he advises them to do is to change their diets.

Specifically, he tells them to go vegan.

Dr. Williams became a vegan in 2003, because he was concerned that his LDL cholesterol — the kind associated with an increased risk of heart disease — was too high. Dr. Williams wrote about his reasons for going vegan and his belief in the cardiovascular benefits of a plant-based diet in a recent essay at MedPage Today.

Vegetarianism has grown in popularity in recent years, fueled by the explosion of meat-free cookbooks and restaurants, and vegan-friendly products in grocery stores. But the endorsement by the man who is set to become the president of one of the country’s leading cardiology associations, which helps formulate health policy and guidelines, did not strike a totally positive chord.
Summary: Lifestyle Management of Hypertension and Dyslipidemia

Diet

**Emphasize:**
- Whole grains, nuts, fruits and vegetables (8-10 servings/day per DASH)... fiber rich foods
- Low-fat dairy (2-3 servings/day per DASH)?
- **Beans! Dark chocolate!** Plant portfolio (sterols [eg, from vegetable oils, nuts, cereals], almonds, fiber, soy)!
- High potassium (4.7 g/day)

**De-emphasize, reduce, limit:**
- Alcohol: ≤ 2 drinks/day (men) or ≤ 1 drink/day (women)
- Salt: 1.5 g/day of sodium (= 3.8 g/day of salt)
- Cholesterol (< 300 mg/day)
- Saturated fat (< 7% calorie intake)

**DASH pattern, Mediterranean Diet, Vegetarian or Vegan Diet...**

Summary: Lifestyle Management of Hypertension and Dyslipidemia

- Consider supplements for dyslipidemia... oats, barley, psyllium
- Physical activity
  - Goal: ≥ 150 minutes/week of moderate intensity exercise
- Maintain a healthy weight
  - Goal: BMI ≤ 25
- Avoid tobacco smoke
- Manage stress
  - Goal: 20 minutes twice/day
  - Consider yoga, meditation, exercise, socialization
- Sleep!
  - Goal: 7-9 hrs/night
LIFESTYLE MEDICINE: TREATING THE CAUSES OF DISEASE

Mark A. Hyman, M.D.; Dean Ornish, M.D.; Michael Roizen, M.D.

Recently, at a summit gathering in Martha’s Vineyard in support of the Robert F. Kennedy Center for Justice and Human Rights, Larry Summers, Ph.D., economist and director of the White House’s National Economic Council, spoke about our nation’s escape from economic depression. Dr. Summers also addressed the root causes underlying this economic and social crisis and how our healthcare costs are not necessarily addressed now. He was asked how we could cut costs without tackling the root causes of the problems, the fact that most of the chronic diseases often leading to 160 million Americans and account for 78% of our healthcare costs are caused by lifestyle and environmental factors—namely our diet, sedentary lifestyle, smoking, chronic stress, and environmental toxins.

This study is only one among a large evidence base documenting how lifestyle interventions are often more effective in reducing cardiovascular disease, hypertension, heart failure, stroke, cancer, diabetes, and overall mortality than almost any other medical interventions. It is because lifestyle addresses not only risk factor modification or reduction, but lifestyle and environmental interventions influence the fundamental biological mechanisms leading to disease, changes in gene expression, which modulate inflammation, oxidative stress, and metabolic dysfunction.

The distinction between risk factors and causes is an important one. High blood pressure, diabetes, and elevated C-reactive protein or glucose are not in and of themselves the root causes of chronic disease but simply surrogate markers that are the effects of environmental toxins, what we eat, how much we exercise, and how we respond to stress.

education or practice. It should be the foundation of our healthcare system.

For example, the recent “TFC” study published in the Archives of Internal Medicine studied 32,000 people’s adherence to 4 simple behaviors (not smoking, exercising 3.5 hours a week, eating a healthy diet [fruits, vegetables, beans, whole grains, nuts, seeds, and limited amounts of meat], and maintaining a healthy weight [BMI<30]). In those adhering to these behaviors, 89% of diabetics, 78% of heart attacks, 56% of strokes, and 38% of all cancers were prevented.2

Perspectives on Healthcare Reform

Education or practice. It should be the foundation of our healthcare system.

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The distinction between risk factors and causes is an important one. High blood pressure, diabetes, and elevated C-reactive protein or glucose are not in and of themselves the root causes of chronic disease but simply surrogate markers that are the effects of environmental toxins, what we eat, how much we exercise, and how we respond to stress.
Look for the support of lifestyle medicine clinicians or lifestyle programs to support comprehensive behavior changes
Thank You

Cleveland Clinic

Every life deserves world class care.