P.O. Box 144345 Austin, TX 78714-4345 ▪ 512.926.4900 ▪ Fax: 512.926.2345 ▪ www.herbalgram.org

HerbClip™

Laura Bystrom, PhD Alexis Collins, MS Blake Ebersole, MBA
Mariann Garner-Wizard Shari Henson Amy Keller, PhD Heather S Oliff, PhD

Executive Editor – Mark Blumenthal *Managing Editor* – Lori Glenn

Consulting Editors – Wendy Applequist, PhD, Thomas Brendler, Lisa Anne Marshall, Allison McCutcheon, PhD, J. Erin Smith, MSc, Carrie Waterman, PhD

Assistant Editor – Tamarind Reaves

File: ■ Pomegranate (*Punica granatum*, Lythraceae)
■ Blood Pressure
■ Systematic Review/Meta-analysis

HC 021761-563

Date: February 28, 2017

RE: Meta-analysis Reports that Pomegranate Juice Consumption Causes Clinically Meaningful Reductions in Blood Pressure

Sahebkar A, Ferri C, Giorgini P, Bo S, Nachtigal P, Grassi D. Effects of pomegranate juice on blood pressure: a systematic review and meta-analysis of randomized controlled trials. *Pharmacol Res*. January 2017;115:149-161.

Elevated blood pressure increases risk for cardiovascular disease and may be a worthy target of novel therapeutics. A diet rich in fruits and vegetables could confer a protective effect against cardiovascular disease due to the presence of bioactive compounds such as polyphenols, which, among other activities, may lower blood pressure. Pomegranate (*Punica granatum*, Lythraceae) juice contains polyphenols and may help alleviate cardiovascular disease risk; however, studies investigating pomegranate juice report inconsistent results. This systematic review and meta-analysis analyzed randomized controlled trials of pomegranate juice for potential effects on blood pressure.

The databases Scopus, Medline, MagIran, and Scientific Information Database were searched from their starting date to December 12, 2014, with no language restrictions. Search terms included "randomized controlled trial" OR randomized OR placebo, "blood pressure" OR hypertension OR anti-hypertensive OR hypotension OR hypotensive, and pomegranate OR *Punica*. Studies included were randomized controlled trials that researched the effects of pomegranate juice on blood pressure, included "sufficient" data on baseline and endpoint parameters (which apparently included blood lipid levels), and had a minimum two-week treatment period. Trials that were not clinical studies or did not include controls, lacked adequate baseline or follow-up data, used a pomegranate product that was not juice or not orally dosed, or used another fruit juice or potentially bioactive substance as a control were excluded.

Data collected from trials included the first author's name, year of publication, study site, numbers of subjects, treatment dose and length of administration, and study subjects' age, gender, body mass index, total cholesterol and low-density lipoprotein and high-density lipoprotein cholesterol concentrations, triglyceride and glucose concentrations, systolic and diastolic blood pressure (SBP and DBP, respectively), and fasting glucose concentrations. Potential bias was measured according to the Cochrane criteria, which

include factors such as adequacy of sequence generation, allocation concealment, blinding, and discussion of dropouts.

The literature search yielded 986 studies, of which 930 could be excluded by examination of their titles and abstracts, following the criteria listed above. Out of the studies left, 48 were excluded after further examination, leaving eight trials for the systematic review and meta-analysis. When data from all were combined, 322 subjects were in a pomegranate group and 252 were in a control group. Trials were published from 2004 to 2014. Two studies were single-blind, placebo-controlled, double-arm trials, one was a placebo-controlled, crossover design (whose subjects were therefore in both the pomegranate and control groups), and the remaining studies were randomized, double-blind, placebo-controlled trials. Duration of treatment ranged from two weeks to 18 months. Patients had a range of health issues or cardiovascular risk factors, including hypertension, ischemic coronary heart disease, carotid artery stenosis, one or more cardiovascular risk factors and high carotid intima-media thickness, type 2 diabetes, and/or hemodialysis. Healthy subjects also were included.

Quality of bias was investigated, and it is stated that "almost all studies" had a low-bias risk. A few studies had missing data on randomization processes, allocation concealment, or blinding. Additionally, there was no evidence of significant publication bias. There were significant decreases in both SBP (weighted mean difference [WMD], −4.96 mmHg; 95% confidence intervals [CI], −7.67 to −2.25; P<0.001) and DBP (WMD, −2.01 mmHg; 95% CI, −3.71 to −0.31; P=0.021) in those consuming pomegranate juice. SBP was significantly reduced in both subjects who consumed pomegranate for > 12 weeks (WMD, −4.36 mmHg; 95% CI, −7.89 to −0.82; P=0.016) and in those consuming juice for < 12 weeks (WMD, −5.83 mmHg; 95% CI, −10.05 to −1.61; P=0.007). The decrease in DBP was significant only in those consuming juice < 12 weeks (WMD, −3.93 mmHg; 95% CI, −6.80 to −1.06; P=0.007).

The decrease in SBP was also significant in both subjects consuming > 240 ml/day (WMD, −3.63 mmHg; 95% CI, −6.62 to −0.63; P=0.018) and in those consuming < 240 ml/day (WMD, −11.01 mmHg; 95% CI, −17.38 to −4.65; P=0.001). Reductions in DBP were not statistically significant at either dosage concentration (evidently because of the smaller number of subjects in each group). According to a meta-regression analysis, there were no associations between the SBP and DBP changes and the dosage or duration of pomegranate juice consumption.

In conclusion, this meta-analysis suggests that pomegranate juice consumption is efficacious for lowering blood pressure. Cited literature indicates that a population-level effect of this size can meaningfully reduce cardiovascular disease. It is suggested that this effect may be due to flavonoids present in the juice; however, any measurements of this parameter are omitted here. Discussed limitations include the small number of studies and subjects, variation among studies, and differences in subject health. Further study in hypertensive populations would clarify the efficacy of pomegranate juice consumption on lowering blood pressure.

—Amy C. Keller, PhD

The American Botanical Council has chosen not to reprint the original article.

The American Botanical Council provides this review as an educational service. By providing this service, ABC does not warrant that the data is accurate and correct, nor does distribution of the article constitute any endorsement of the information contained or of the views of the authors.

ABC does not authorize the copying or use of the original articles. Reproduction of the reviews is allowed on a limited basis for students, colleagues, employees and/or members. Other uses and distribution require prior approval from ABC.