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Nutraceuticals with a Clinically Detectable Blood Pressure ‐ Lowering Effect.

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ABSTRACT

The goal of this study was to look at and discuss the existing research on nutraceuticals (natural health products) that have been proven to help lower blood pressure.

METHODS

We looked at studies published in English between 1990 and 2015 that discussed dietary supplements or nutraceuticals said to affect human blood pressure. First, we made a list of possible useful products from the *Natural Medicine Comprehensive Database*. Then, we searched PubMed using terms like “hypertension,” “blood pressure,” “dietary supplement,” and “nutraceuticals,” alone and together. Finally, we focused mainly on meta-analyses and randomized clinical trials.

RESULTS

Besides the well-known blood pressure benefits of the DASH and Mediterranean diets, many studies have explored how various dietary supplements and nutraceuticals might help lower blood pressure. Most of these are antioxidant substances that are safe and well-tolerated. Strong evidence supports the use of potassium, magnesium, L-arginine, vitamin C, cocoa flavonoids, beetroot juice, coenzyme Q10, controlled-release melatonin, and aged garlic extract. Their blood pressure–lowering effects depend on the dose, and they are generally safe to use.

CONCLUSION

Some nutraceuticals may help lower blood pressure in people. However, more clinical research is needed to find out which of these are the most effective, safest, and affordable for long-term use in people with mild high blood pressure and low heart disease risk..

Keywords: blood pressure, BP, clinical evidence review, dietary supplements, hypertension, nutraceuticals

Introduction

Introduction (Simplified):

High blood pressure (BP) is one of the main independent risk factors for heart and blood vessel diseases and is one of the most common health problems worldwide. The lifetime chance of developing high BP is about **90%**, and by **2025**, around **1.56 billion people** are expected to have it. Globally, high BP causes about **7.6 million early deaths** and **92 million years of lost healthy life** each year.

Studies have shown that keeping BP within a normal range reduces the risk of heart problems, even in people whose BP is only slightly above normal. This highlights the importance of improving BP control in everyone. However, since it isn’t practical to give BP medicines to all people with mildly high BP, major international guidelines recommend **diet and lifestyle changes** as the first step to prevent and control high BP.

Well-known lifestyle factors that raise BP include eating too much **salt**, drinking too much **alcohol**, and being **physically inactive**. Other causes include **low intake of fruits, vegetables, dairy, and oily fish**, and **deficiency of vitamins and minerals** like **folate, riboflavin, vitamin C, and vitamin D**. These poor dietary habits, along with **unhealthy behaviors** and **rising obesity**, strongly increase the risk of developing high BP. Fortunately, these factors can be improved through **nutrition and public health programs**.

Methods

We reviewed studies on dietary supplements or nutraceuticals claiming to have an effect on human BP, published in the English language from January 1990 to October 2015. An initial list of possibly effective agents and studies was obtained from the online reference, the Natural Medicine Comprehensive

Database. Using PubMed, for confirmation, we rechecked agents identified from this list using the MeSH terms 'hypertension', 'blood pressure', 'dietary supplement' and 'nutraceuticals', alone and in combination. We then focused our attention on meta-analyses and randomized clinical trials (RCTs).

Foods

Olive Oil and the Mediterranean Diet

In a large European study (EPIC study) involving over 20,000 people, those who regularly consumed **extra-virgin olive oil**—which is rich in healthy polyphenols—had **lower systolic and diastolic blood pressure**.

In another major study, the **PREDIMED trial**, which included 7,447 people at high risk of heart disease, participants who followed a **Mediterranean diet with extra-virgin olive oil** (about 1 liter per week) had **significantly lower diastolic blood pressure** than those in the control group.

Another study on **identical twins with high BP** found that taking **olive leaf extract (500–1000 mg daily for 8 weeks)** lowered BP depending on the dose — the lower dose reduced BP by **3/1 mmHg**, while the higher dose reduced it by **11/4 mmHg** compared with a placebo.

Beetroot Juice

Beetroot juice is rich in **nitrates (NO_3^-)**, which the body converts into **nitrites (NO_2^-)** and then into **nitric oxide (NO)** — a natural chemical that helps relax blood vessels and improve blood flow.

Drinking about **250 ml of beetroot juice daily** can **quickly lower blood pressure** in people with normal or slightly high BP.

A review of several clinical trials found that beetroot juice lowered systolic BP by about **4.4 mmHg** on average. The amount and duration of intake ranged from **5.1–45 mmol of nitrate (about 321–2790 mg)** for **2 hours to 15 days**, and the effect increased with higher doses.

Cocoa

Cocoa flavonoids (natural compounds found in dark chocolate) have **antioxidant and anti-inflammatory effects**, help improve **nitric oxide production**, and protect blood vessels. These effects can lower the risk of heart disease.

Studies show that dark chocolate can **improve blood vessel function** in both healthy and hypertensive people, even those with high blood sugar.

A review of **20 clinical trials** with **856 participants** found that consuming **flavanol-rich cocoa** for **2 to 18 weeks** lowered systolic BP by about **2.8 mmHg** and diastolic BP by **2.2 mmHg** on average. Participants consumed between **30–1080 mg of flavanols per day** through cocoa or chocolate.

A large ongoing study in the U.S. is now testing whether **cocoa extract supplements** can reduce major heart problems in **18,000 older adults** over four years.

Tea

Drinking **green or black tea regularly (2–6 cups a day for 4–24 weeks)** has been shown to slightly but significantly lower blood pressure.

- **Green tea** reduced systolic BP by about **2.1 mmHg** and diastolic BP by **1.7 mmHg**.
- **Black tea** reduced systolic BP by **1.4 mmHg** and diastolic BP by **1.1 mmHg**.
- The effect was stronger when tea was consumed for more than **12 weeks**.
- Green tea works a little better than black tea because it contains **more antioxidants and catechins**, which help reduce oxidative stress and protect blood vessels.
- Another type of tea, **Hibiscus sabdariffa (sour tea)**, also lowers BP. In studies of 390 people, drinking **2–4 cups a day for 4–8 weeks** significantly reduced BP, even in those already taking blood pressure medicine.

Nutrients

Omega-3 Polyunsaturated Fatty Acids (PUFAs)

Omega-3 fatty acids can help lower blood pressure (BP) in several ways: they increase the production of **nitric oxide (NO)**, a substance that relaxes blood vessels; improve **prostaglandin balance** toward vessel dilation; reduce **insulin resistance**; regulate blood vessel tone via the nervous system; and suppress the **renin–angiotensin–aldosterone system**, which controls BP.

Studies show that taking **0.3–15 g/day of omega-3s for 4–26 weeks** lowers systolic BP by about **1.5 mmHg** and diastolic BP by **1.0 mmHg**, with bigger reductions in people who are not on BP medications (**SBP −4.5 mmHg; DBP −3.0 mmHg**). Omega-3s also improve **arterial stiffness and flexibility**. High doses may cause mild stomach upset but are otherwise safe.

Proteins, Peptides, and Amino Acids

Eating more protein instead of carbohydrates slightly lowers BP: **−1.8 mmHg SBP and −1.2 mmHg DBP**. Both **vegetable and animal proteins** reduce BP.

- **Soy protein** (60–110 mg/day) can lower SBP by **~6 mmHg** and DBP by **~3 mmHg** in people with hypertension.
- **Whey proteins** and certain **milk peptides** can lower BP by **blocking ACE**, improving blood vessel function, or through other mechanisms.
- Some **fish peptides** also reduce BP significantly (**~9/4 mmHg**).
- **L-arginine**, an amino acid that helps produce NO, lowers SBP by **~5.4 mmHg** and DBP by **~2.7 mmHg** in 2–12 weeks.

Potassium, Magnesium, and Minerals

- **Potassium (K+)** lowers BP by 4–8 mmHg (SBP) and 2.5–4 mmHg (DBP) in hypertensive people. A diet rich in K+ also reduces risk of stroke, heart disease, and diabetes. K+ works by helping kidneys excrete sodium, relaxing vessels, and improving blood vessel and nerve function.
- **Magnesium (Mg++)** lowers BP by 3–4 mmHg (SBP) and 2.5 mmHg (DBP), especially at doses of 500–1000 mg/day, often combined with taurine. It relaxes vessels, increases prostaglandins, and improves NO production.
- **Calcium (Ca++)** supplements do not lower BP in most adults but are useful in pregnancy to prevent pre-eclampsia and preterm birth.

Vitamins

- **Vitamin C** deficiency is linked to higher BP. Taking **500–1000 mg/day** can lower SBP by ~5 mmHg and may enhance the effect of BP medications. It works by increasing NO, improving vessel function, and reducing oxidative stress.
- **Vitamin D** deficiency is also associated with high BP, though evidence is less detailed.

Soluble Fibre and Flaxseed

- Soluble fibres from **guar gum, psyllium, oat bran, guava** can lower BP by **~7.5/5.5 mmHg** and improve blood sugar and cholesterol.
- **Flaxseed** slightly reduces SBP (~1.8 mmHg) and DBP (~1.6 mmHg), with better effects from whole flaxseed or longer use (>12 weeks).

Non-Nutrient Nutraceuticals

Resveratrol and Grape Seed Extract

- Resveratrol (from grapes) lowers BP through antioxidant effects and improving NO. High doses (≥150 mg/day) reduce SBP by ~12 mmHg.
- Grape seed extract slightly reduces SBP (~1.5 mmHg).

Coenzyme Q10 (CoQ10)

- CoQ10 is an antioxidant found in meat and fish. Taking ≥100 mg/day can lower SBP by ~11 mmHg and DBP by ~7 mmHg in hypertensive patients.

Lycopene

- Lycopene (from tomatoes or supplements) reduces SBP by ~5–6 mmHg and can add to the effect of BP drugs.

Pycnogenol

- Extract from French maritime pine bark acts like a natural ACE inhibitor and improves vessel function. Taking 100 mg/day can allow reductions in other BP medications.

Melatonin

- Nighttime melatonin (2–5 mg/day) improves BP control, especially at night, and helps sleep in people taking beta-blockers.

Aged Garlic Extract

- Garlic improves BP by increasing NO and hydrogen sulfide, relaxing vessels, and blocking ACE. Taking garlic extract can reduce SBP by ~9 mmHg and DBP by ~4 mmHg, adding to standard therapy. Mild digestive issues may occur.

Probiotics

- Probiotic-rich foods or supplements slightly reduce BP (SBP ~3.1 mmHg; DBP ~1.1 mmHg), especially in people with high BP, when multiple strains are taken, or for ≥8 weeks.

Other Nutraceuticals

- Preliminary evidence suggests small BP-lowering effects from **black sesame, pomegranate juice, green coffee, hawthorn, vitamins B6 and D, α-lipoic acid, carnitine, and taurine**, but more studies are needed.

Conclusion

Using certain **nutraceuticals** (natural substances that can help lower blood pressure) along with a **healthy diet and lifestyle** could be a good way to manage people with **prehypertension** and can also **support medication** in people with hypertension.

In particular, increasing intake of:

- **Potassium (K+), calcium (Ca++), magnesium (Mg++)**
- **Fish oil, fibre**
- **Nitric oxide (NO) donors, natural antioxidants**
- **Proteins from milk and plants**

…can help many people control their blood pressure.

However, we **still need more information** on the **long-term safety** of using these products, especially at high doses or when combined. More studies are also needed to figure out **which nutraceuticals are most effective, safe, and cost-efficient** for the general population with mild, uncomplicated hypertension.

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