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Herbs for Hypertension: An Evidence-Based Learning

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ABSTRACT

Hypertension is one of the leading mortality diseases in Worldwide. Some of the native herbs has the phenomenon to reduce the blood pressure ideally. Here the author listed 9 herbs which were help to reduce blood pressure. There are other number of herbs help in reduction of blood pressure directly or indirectly. We have a various clinical trials about these herbs, still we need trials on human subject. This the way found helpful in the improve AYUSH practice among public, helps in door to door medical care, reduces out of pocket expenditure and also can reduce withdrawal of treatment. The author recommend further research studies on alternative treatment for chronic diseases.

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INTRODUCTION

After the pandemic, health seeking behavior has been changed to positive ways. The pandemic taught the importance of family, nativity and also the life. This may be the turning point in to search for quality health care among public. The native medicine had high domination during pandemic even through complete lockdown, it reached almost every household via social media. Above all the public shown interest in ending chronic diseases by native medicine. Hypertension is one of the leading mortality diseases in Worldwide. Some of the native herbs has the phenomenon to reduce the blood pressure ideally. Here the author listed 9 herbs which were help to reduce blood pressure.

1. Basil (*Ocimum basilicum*)

Originally basil is native to India, Asia, and Africa, basil was held to be a sacred and noble herb. The Greek word "basil" means "royal". Basil contains many vitamins and minerals, as well as antioxidants such as lutein, zeaxanthin, beta-carotene, and beta-cryptoxanthin. It has various medical benefits such as reduction of oxidative stress, prevention of cancer & heart disease, regulation of blood sugar level, improved mental health, reduced inflammation and protection against infection. Here are some of the studies that reveal even the anti-hypertensive effects of Basil listed below.

Umar et.al., (2010) conducted a study to investigate the possible antihypertensive effects of OBL extract in renovascular hypertensive rats. Rats were randomized into sham, untreated 2K1C, captopril- (30 mg kg(-1) per day orally) and OBL- (100, 200, 400 mg kg(-1) per day orally) (low (L)-, medium (M)-, high (H)-OBL) treated 2K1C groups (n=10-12 per group), followed up for 4 weeks. Blood pressure, heart weight/body weight, plasma angiotensin-II and endothelin (ET)-1 were studied. OBL reduced systolic and diastolic blood pressure by about 20 and 15 mm Hg, respectively, compared with 35 and 22 mm Hg for captopril, from the lowest dose tested with no dose dependency.

Amrani S et.al. (2009) found out the endothelium-dependant vasorelaxant and anti-platelet aggregation activities of an aqueous extract from Ocimum basilicum. The vasorelaxant effect was undertaken in thoracic aorta from three experimental groups of rats: one of them (NCG) fed with standard diet, the second (HCG) with hypercholesterolemic diet (HCD) and the third (BTG)

with hypercholesterolemic diet together with an intragastric administration of Ocimum basilicum extract at a dose of 0.5 g/kg body weight for a period of 10 weeks. The in vitro anti-platelet aggregation of Ocimum basilicum extract was studied using thrombin (0.5 U/ml) and ADP (5 micron) as agonists. They found that the use of Ocimum basilicum as a medicinal plant could be beneficial for cardiovascular system.

Nagar (2017), did a systematic review of the literature on clinical Efficacy and Safety of Tulsi in Humans. They reviewed the human studies that reported on a clinical outcome after ingestion of tulsi. A total of 24 studies were identified that reported therapeutic effects on metabolic disorders, cardiovascular disease, immunity, and neurocognition. The reviewed studies reinforce traditional uses and suggest tulsi is an effective treatment for lifestyle-related chronic diseases including diabetes, metabolic syndrome, and psychological stress. Further studies are required to explore mechanisms of action, clarify the dosage and dose form, and determine the populations most likely to benefit from Tulsi's therapeutic effects.

2. Ashwagandha (*Withania somnifera)*

Ashwagandha is one of the most important herbs in Ayurveda, to relieve stress, increase energy levels, and improve concentration. “Ashwagandha” is Sanskrit for “smell of the horse,” which refers to trusted Source both the herb’s scent and its potential ability to increase strength. It helps relieve anxiety, lowers blood sugar and fat, increase muscle and strength, improves sexual function, sharpens focus and memory and supports health. Ashwagandha reduces blood pressure by reducing stress and anxiety. The reviews would support the ashwagandha benefits on blood pressure.

Adrian et.al, (2019), investigated the stress-relieving and pharmacological actions of an ashwagandha extract. In this 60-day, randomized, double-blind, placebo-controlled study the stress-relieving and pharmacological activity of an ashwagandha extract was investigated in stressed, healthy adults. Sixty adults were randomly allocated to take either a placebo or 240 mg of a standardized ashwagandha extract (Shoden) once daily. Outcomes were measured using the Hamilton Anxiety Rating Scale (HAM-A), Depression, Anxiety, and Stress Scale -21 (DASS-21), and hormonal changes in cortisol, dehydroepiandrosterone-sulphate (DHEA-S), and

testosterone. These findings suggest that ashwagandha's stress-relieving effects may occur via its moderating effect on the hypothalamus-pituitary-adrenal axis. However, further investigation utilizing larger sample sizes, diverse clinical and cultural populations, and varying treatment dosages are needed to substantiate these findings.

Salve et.al, (2019), did a double-blind, randomized, placebo-controlled clinical study to identify adaptogenic and anxiolytic effects of ashwagandha root in healthy adults. Sixty male and female participants with a baseline perceived stress scale (PSS) score >20 were randomized to receive capsules of Ashwagandha extract 125 mg, Ashwagandha extract 300 mg or an identical placebo twice daily for eight weeks in a 1:1:1 ratio. Stress was assessed using PSS at baseline, four weeks and eight weeks. The researcher concluded that Ashwagandha root aqueous extract was beneficial in reducing stress and anxiety.

Kushwaha et.al, (2012) studied the effect of Ashwagandha (Withania somnifera) Root Powder Supplementation in the Treatment of Hypertension. 51 stress-oriented hypertensive subjects in the age group of 40 to 70 years, were selected by purposive sampling. Subjects were divided into Group I and Group II. Supplementation of 2gm of Ashwagandha root powder was given to group I and group II with milk and water respectively in morning. Overall decrease in systolic blood pressure was found though it was non-significant. Further, decrease in systolic blood pressure was significant in group I, whereas the decrease in diastolic blood pressure was significant in both groups. Hence, supplementation of Ashwagandha with milk is recommended in the treatment of stress-oriented hypertension.

Chandrasekhar (2012) studies the effect of high concentration full spectrum effect of ashwagandha root in reducing stress and anxiety in adults. Among 64 samples, with a history of chronic stress were selected for this study. The results found that, The findings of this study suggest that a high-concentration full-spectrum *Ashwagandha* root extract safely and effectively improves an individual's resistance towards stress and thereby improves self-assessed quality of life.

3. Garlic

Garlic is highly nutritious but has very few calories Garlic contains compounds with potent medicinal properties Garlic can help protect against illness, including the common cold, the active compounds in garlic can reduce blood pressure Garlic improves cholesterol levels, which may lower the risk of heart disease Garlic contains antioxidants that may help prevent Alzheimer's disease and dementia. Eating garlic may help detoxify heavy metals in the body Garlic may improve bone health.

Shi et.al, (2019), conducted a population-based cohort study on garlic consumption and all-cause mortality among Chinese old individuals. Among 92,505 person-years of follow-up from baseline to September 1, 2014, 22,321 participants died. Participants who often (≥5 times/week) or occasionally (1–4 times/week) consumed garlic survived longer than those who rarely (less than once/week) consumed it ($p < 0.001$). Participants who consumed garlic occasionally or often had a lower risk for mortality than those who rarely consumed garlic at baseline; the adjusted HRs for mortality were 0.92(0.89–0.94) and 0.89(0.85–0.92), respectively. The inverse associations between garlic consumption and all-cause mortality were robust in sensitivity analyses and subgroup analyses. In this study, habitual consumption of garlic was associated with a lower all-cause mortality risk; this advocates further investigation into garlic consumption for promoting longevity.

Karin Ried (2020). did meta-analysis on garlic lowers blood pressure in hypertensive subjects. The meta-analysis of 12 trials and 553 hypertensive participants confirmed that garlic supplements lower systolic blood pressure (SBP) by an average of 8.3±1.9 mmHg and diastolic blood pressure by 5.5±1.9 mmHg, similar to standard anti-hypertensive medications. This reduction in blood pressure was associated with a 16–40% reduction in the risk of suffering from cardiovascular events. Thus, Kyolic aged garlic extract is considered to be highly tolerable with a high safety profile either as a stand-alone or adjunctive anti-hypertensive treatment, with multiple benefits for cardiovascular health.

Matsutoma (2020), studied the potential benefits of garlic and other dietary supplements for the management of hypertension. This study focuses on garlic and several other dietary

supplements, such as coenzyme Q10, fish oil and probiotics that have exhibited significant beneficial effects on blood pressure in clinical trials. In addition, we discuss the possible mechanisms of action responsible for their anti-hypertensive effects, as well as the safety, active ingredients and their potential use as adjunct therapies for uncontrolled hypertension.

Bayan (2014), reviewed the potential therapeutic effects. These studies raised the possibility of revival of garlic therapeutic values in different diseases. Different compounds in garlic are thought to reduce the risk for cardiovascular diseases, have anti-tumor and anti-microbial effects, and show benefit on high blood glucose concentration. However, the exact mechanism of all ingredients and their long-term effects are not fully understood. Further studies are needed to elucidate the pathophysiological mechanisms of action of garlic as well as its efficacy and safety in the treatment of various diseases.

4. Ajwain (*Trachyspermum ammi)*

Ajwain is an Indian spice commonly used as a remedy for gastrointestinal problems like indigestion, flatulence and colic pain. Ajwain seeds possess carminative, antimicrobial and liver protective properties. It is also known to have blood pressure lowering and bronchodilatory (substance that increases airflow to the lungs) properties. Ajwain water is an effective home remedy for indigestion and acidity. It can be prepared by adding slightly roasted Ajwain seeds to a glass of warm water. Ajmoda churn can be given to rheumatic arthritis patients to get relief from constipation. This is due to its laxative properties. An important precaution with Ajwain is that it should be avoided during pregnancy. This is because it can cause uterine contractions leading to miscarriage.

Mishra (2020). in his article, he mentioned that, Trachyspermum Ammi (Ajwain) is a natural spice that is very beneficial and shows a variety of pharmacological functions. Almost all the parts of Ajwain play different pharmacological actions. The oil of Ajwain seed contains a component named turmoil which is very beneficial. Ajwain shows actions like diuretic, antihypertensive, Antispasmodic, antiflatulent, antihelminthic, antiplatelet, bronchodilation, antiulcer, antitussive, analgesic, hepatoprotective and other activities so it is necessary to investigate these type of natural products and to provide safe and effective medications to human

race. These Superfoods may also have many hidden properties; hence it is necessary to study Ajwain and its constituents.

Saleem (2017), studied Pharmacological Screening of *Trachyspermum ammi* for Anti-hyperlipidemic Activity in Triton X-100 Induced Hyperlipidemia Rat Model. Forty-five, male albino rats were used and randomly divided into nine equal groups (n = 5). The lipid levels were increased after 24 h of single intraperitoneal injection of Triton X-100 (100 mg/kg) in rats. In this study they found *T. ammi* possessed antioxidant and antihyperlipidemic activities along with hepato- and nephro-protective effects.

5. Jatamansi (*Nardostachys jatamansi*)

Jatamansi is almost forgotten herb. It has antiarrhythmic properties, regulate the appetite, liver-protecting capability, relives phlegm-related properties, is helpful in cases like scorpion stings, and supports neurological activities. It also has antioxidant and anti-inflammatory benefits, promotes hair growth, reduces stress, aids sleep, protects the liver, counters neurodegenerative diseases like Alzheimer's, lowers high blood pressure, controls asthma attacks, helps treat epilepsy, helps fight depression, helps fight depression, potential to fight cancer.

Chaudhary (2021) did a clinical study to evaluate the effect of jatamansyadi kwatha and shirodhara in the management of hypertension. Twenty patients of either sex of stage-I essential hypertension in the age group of 20-80 years were registered for the present study. In group-I, hypertensive patients were managed with jatamansyadi kwatha and in group II patients, in addition to the administration of jatamansyadi kwatha, shirodhara was also done for 30 days. After one month of therapy, statistically highly significant reduction in both systolic & diastolic BP was observed in both groups. In group-II patients, statistically significant reduction in mean arterial BP., pulse pressure and pulse rate were observed. Whereas in group I, the effect of therapy on mean arterial BP, pulse pressure and pulse rate were statistically insignificant. Therapy given in group II has shown the marginal advantage over the therapy given in group-I. However statistically highly significant reduction was observed in both systolic and diastolic blood pressure in both the groups but the intergroup difference between the therapies was statistically insignificant.

Bhat (2020), found the efficiency of Nardostachys Jatamansi in essential hypertesnion. The single blind randomized, placebo controlled study was conducted with 40 patients aged between 35-70 years. The participants were randomly allocated to receive either a total of 3 g of N. Jatamansi (1 capsule 3 times a day) or placebo for 4 weeks. Patients using ≤ 2 antihypertensive drugs with stage 1 hypertension were included in the study. Systolic and diastolic Blood pressure was recorded at baseline and at every week for four weeks. MINICHAL score (for Quality of Life) was recorded at baseline and at the end of the trial. The present findings suggest that N. Jatamansi is effective in reducing both systolic and diastolic blood pressure in essential hypertension. Moreover, studies on efficacy of different doses and treatment duration of test drug are required to finetune these observations.

Pawar (2022) studied the efficacy of Jatamansi Phanta in Hypertension. He wrote as blood pressure can be managed with drugs as well as non-pharmacological measures which consist of exercise, weight reduction, salt restriction, eating fruits and vegetables, etc. Non-pharmacological measures play an important role in management of hypertension. The use of medicinal plants for treatment of hypertension is very common because these remedies are easily available and low cost than novel pharmaceuticals. Herbs do not cause side effects like weakness, tiredness, drowsiness, impotence, cold hands and feet, depression, insomnia, abnormal heartbeats, skin rash, dry mouth, dry cough, stuffy nose, headache, dizziness, swelling around eyes, constipation or diarrhea, fever etc.

6. Arjuna *(Triphaladi Kala Basti)*

Arjuna is best known as one of the foremost Ayurvedic herbs for supporting all areas of heart health. Here are a few of arjuna's remarkable benefits when it comes to promoting cardiovascular wellness it Strengthen **heart function and healthy circulation, aids in Healthy flow of blood and helps in Emotional wellness.** It also has effect on balancing lung, healthy liver and skin, comfortable digestion and healthy reproductive tissues.

Hivala (2018), dis a clinical study on effect of *Triphaladi Kala Basti* with *Arjuna Punarnavadi Ghanavati* in the management of essential hypertension. Fifteen patients who were diagnosed with cases of essential hypertension as per the 7th JNC and World Health Organization criteria

for diagnosis of hypertension were treated with *Triphaladi Basti* followed by oral administration of *Arjuna Punarnavadi Ghanavati*. Administration of *Basti* and *Arjuna Punarnavadi Ghanavati* were effective in reducing both systolic and diastolic blood pressure level which was highly significant ($P < 0.001$). Hense, *Triphaladi Kala Basti* procedure along with oral administration of *Arjuna Punarnavadi Ghanavati* is moderately effective in the management of systemic arterial hypertension.

Meghwani (2019), did an experiment on the beneficial effects of aqueous extract of stem bark of Terminalia arjuna in pulmonary hypertension. They found that the aqueous extract of Terminalia arjuna prevented MCT-induced pulmonary hypertension which may be attributed to its antioxidant as well as its effects on pulmonary arteriolar wall thickening.

Dwivedi s (2014) wrote an article on revisiting terminalia arjuna - an ancient cardiovascular drug. He reviewed most of the studies, both experimental and clinical, have suggested that the crude drug possesses anti-ischemic, antioxidant, hypolipidemic, and antiatherogenic activities. Its useful phytoconstituents are Triterpenoids, β-sitosterol, flavonoids, and glycosides. Triterpenoids and flavonoids are considered to be responsible for its beneficial antioxidant and cardiovascular properties. The drug has shown promising effect on ischemic cardiomyopathy. So far, no serious side effects have been reported with arjuna therapy. However, its long-term safety still remains to be elucidated. Though it has been found quite useful in angina pectoris, mild hypertension, and dyslipidemia, its exact role in primary/secondary coronary prevention is yet to be explored.

7. Sarpagandha

Sarpagandha is also known as ‘Indian snakeroot’, ‘Chandrabhaga’ or ‘Chhota Chandis’. It has long tapering snake-like roots which are a rich source of reserpine alkaloids. This alkaloid is used in the manufacture of anti-hypertensive and sedative medicines. The roots are also used in Ayurveda and other systems of medicine for curing a wide range of ailments. It mainly reduces hypertension, Suitable remedy for Insomnia, Aids to mental disorders, Lessen greying of hairs, Relief from Arthritis pain, Relief from uterine pain due to or after miscarriage, Controls dysentery, Treatment of snake bite.

Mishra D (2019) studied as effect of Brahmi vati and Sarpagandha Ghana vati in management of essential hypertension. Total 68 patients randomly divided into two groups, group A received capsule *Brahmi vati* 500 mg and group B capsule *Sarpagandha Ghana vati* 500 mg respectively twice a day for 30 days. Follow up visit was on every 15th day. This study showed that both *Brahmi vati* and *Sarpagandha Ghanavati* produced improvement in most of the variables and were comparable. Improvements were seen in various variables like SBP, DBP, MAP, Hamilton anxiety rating scale, subjective sleep profiles and total cholesterol. However, *Brahmi vati* showed an increase in weight and Body Mass Index (BMI). *SarpagandhaGhanavati* produced a reduction in total cholesterol and LDL. Both groups showed good safety profiles evaluated through the assessment of serum creatinine levels. Clinical efficacy of *Sarpagandha Ghana vati* and *Brahmi vati* on EHTN showed that both were effective, safe and comparable.

Lobay (2015), wrote an article on *Rauwolfia* in the Treatment of Hypertension. . This author reviews the scientific literature with regard to the use of *Rauwolfia* and the treatment of hypertension. The author reviews the plant's botany, chemistry, and pharmacology and provides a researched and documented method of action for the active ingredients. With special emphasis on the plant's role in treating high blood pressure, the author looks at the medical uses of the plant, critically examining its adverse side effects, toxicology, and carcinogenicity. The author refutes the association between the plant and carcinogenicity and discusses the importance of correct dosing and of screening patients to minimize the occurrence of depression. He concludes with the recommendation of use of low-dose *Rauwolfia (*LDR) for suitable patients with hypertension. The plant provides clinicians with a safe and effective adjunct to pharmaceuticals in the treatment of high blood pressure.

8. Hibiscus (*Hibiscus rosa-sinensis*)

Hibiscus, also known as rose mallow, is a frost tender flowering plant that belongs to the Malvaceae (Mallow family). There are over 200 species of hibiscus that can be found in the warm and tropical regions all over the world. It has health benefits such as lower cholesterol, aiding in weight loss, helping to treat depression, cures fever, constipation and cold cures,

improves hair growth, lower blood sugar, boost immune system, heals wound and can protect against cancer.

Hopkins et.al, (2013), did a comprehensive review on *Hibiscus sabdariffa* L. in the treatment of hypertension and hyperlipidemia. This comprehensive body of evidence suggests that extracts of HS are promising as a treatment of hypertension and hyperlipidemia, however more high quality animal and human studies informed by actual therapeutic provide recommendations for use that have the potential for widespread public health benefit.

Jalalyazdi et.al, (2020) evaluate of the antihypertensive effect one of these herbs, sour tea (*Hibiscus sabdariffa*), on stage one hypertension. The patients were divided into two groups. The control and case groups received the same lifestyle and dietary advice for controlling blood pressure. The case group received two standard cups of sour tea every morning for 1 month. A total of 46 patients participated in this study and there was no significant difference in terms of age and body mass index between groups. There was a significant reduction in systolic blood pressure in both groups, but the mean reduction in systolic and diastolic blood pressure was significantly higher in the case group ($P = 0.004$ and $P < 0.001$, respectively). Using *H. sabdariffa* as sour tea two times a day can be effective in managing blood pressure in stage one hypertension along with lifestyle and dietary modification.

Shayoub, Mohamed. (2016). aimed to discuss and evaluate the effectiveness of Hibiscus Sabdariffa as antihypertensive agent. In vitro, H. sabdariffa (HS) act as a vasodilator via relaxing the pre-contracted endothelium-intact and endothelium-denuded aortic rings. In man and laboratory animals, aqueous extraction of HS significantly reduced BP in essential hypertensive man, and the calyx extract reduced BP in the spontaneously hypertensive rat. It's also significantly reduced BP in normal rats and anesthetized cats. In addition, there are an evidence reports that the regular use of (HS) can protected the body from the cardiovascular disorder by lowering: total cholesterol, low-density lipoprotein cholesterol (LDL-C) and triglycerides in the majority of normolipidemic, hyperlipidemic and diabetic animal models. All the studies had agreed that Hibiscus Sabdariffa can significantly reduce blood pressure, but all the problems that reported later on in the discussion that have founded on the conducted articles need further evaluation of this herbal remedy to be approved as an effective antihypertensive agent.

Abdelmonem Md. et.al. (2016) studied the efficiency of Hibiscus sabdariffa on reducing blood pressure. A total of 13 RCTs were analyzed. Hibiscus sabdariffa significantly reduced both SBP and DBP compared with placebo. Subgroup analysis showed that change in SBP and DBP was statistically significant in patients with only hypertension, whereas not significant in patients with hypertension associated with MetS. When H. sabdariffa was compared with active controls (antihypertensive drugs or other herbals), the change in SBP and DBP was not statistically significant (all $P > 0.05$). Hibiscus sabdariffa is effective in reducing the SBP and DBP in patients with mild-to-moderate hypertension but was neither effective in those with MetS nor superior to antihypertensive drugs. Further RCTs are required to determine the long-term efficacy of H. sabdariffa and to describe patients who would benefit most from this treatment.

9. Cardamom (*Elettaria cardamomum*)

Cardamom is a spice with an intense, slightly sweet flavor that some people compare to mint. It originated in India but is available worldwide today and used in both sweet and savory recipes. The seeds, oils and extracts of cardamom are thought to have impressive medicinal properties and have been used in traditional medicine for centuries. Here are 10 health benefits of cardamom, backed by science. They were antimicrobial, metabolic syndrome and diabetes, heart health, oral health, liver health, anticancer and ulcer prevention.

Izadi (2020) studied the effect of green cardamom on blood pressure and inflammatory markers among patients with metabolic syndrome and related disorders. Of 625 clinical trials, eight reports with 595 patients were included. The findings indicated that green cardamom significantly decreased diastolic blood pressure, high-sensitivity C-reactive protein, and interleukin 6 levels. However, cardamom supplementation did not significantly affect systolic blood pressure. This meta-analysis demonstrated that green cardamom could improve blood pressure control and exert anti-inflammatory effects which could help patients with unhealthy metabolic profile better manage their health. Importantly, there were few eligible randomized trials with quite a low number of participants. Further prospective studies on larger sample sizes and longer duration of supplementation are warranted for its widespread use.

Verma (2009), studied the Blood pressure lowering, fibrinolysis enhancing and antioxidant activities of cardamom. Twenty, newly diagnosed individuals with primary hypertension of stage 1 were administered 3 g of cardamom powder in two divided doses for 12 weeks. Total antioxidant status was also significantly ($p<0.05$) increased by 90% at the end of 3 months. However, fibrinogen and lipid levels were not significantly altered. All study subjects experienced a feeling of wellbeing without any side-effects. Thus, the present study demonstrates that small cardamom effectively reduces blood pressure, enhances fibrinolysis and improves antioxidant status, without significantly altering blood lipids and fibrinogen levels in stage 1 hypertensive individuals.

Zahedi et.al, (2020) evaluated the effects of green cardamom supplementation on blood pressure and endothelium function in type 2 diabetic patients. Eighty overweight or obese patients with type 2 diabetes mellitus (aged 30–60 years) will be recruited into the trial and will be assigned to receive either cardamom (3 g/day, 6 capsules) or placebo for a period of 10 weeks. Sociodemographic, International Physical Activity Questionnaire, and three 24-hour dietary recall questionnaires will be collected for each participant.

Fatemeh et.al., (2017) did a randomized controlled trial on effect of cardamom supplementation on serum lipids, glycaemic indices and blood pressure in overweight and obese pre-diabetic women. Eighty overweight or obese pre-diabetic women were randomly allocated to two groups. The intervention group received 3 g of green cardamom and the placebo group received 3 g of rusk powder for 2 months. The physical activity level, dietary intake, anthropometric measurements, Blood pressure, fasting blood sugar (FBS), triglyceride (TG), total cholesterol (TC), low density lipoprotein (LDL-C), high density lipoprotein (HDL-C), insulin, body mass index (BMI), insulin resistance, and insulin sensitivity were measured before and after intervention. They found that, green cardamom supplementation may have a protective effect on HDL-C level in pre-diabetic subjects. It improves some blood parameters in these subjects; however, its effects are not different from placebo.

10. Ginger

The common ingredient use in Calms Nausea, Fights Germs, Keeps Your Mouth Healthy, Eases Arthritis Symptoms, Soothes Sore Muscles, Curbs Cancer Growth, Lowers Blood Sugar, Eases

Period Pains, Lowers Cholesterol, Protects Against Disease, Protects Against Disease, Relieves Indigestion.

Torabi (2020) did a systematic review the effect of zingiber officinale (ginger) on hypertension. They reviewed yielded 60 articles. According to animal studies ginger has the potential to offer a natural alternative dietary supplementation to conventional anti-hypertensive agents, but still there is not enough evidence supporting this claim and current limited evidence is controversial. More human trials studying the effect of ginger on hypertensive patients using different dosage of a standardized extract are needed.

Hoang N (2020), Ginger on Human Health, The included studies that examined the improvement of nausea and vomiting in pregnancy, inflammation, metabolic syndromes, digestive function, and colorectal cancer's markers were consistently supported, whereas other expected functions were relatively controversial. Nevertheless, only 43 clinical trials (39.4%) met the criterion of having a 'high quality of evidence. In addition to the quality assessment result, small populations and unstandardized evaluation systems were the observed shortcomings in ginger clinical trials. Further studies with adequate designs are warranted to validate the reported clinical functions of ginger.

Ghayur and Gilani (2015) wrote an article on Ginger lowers blood pressure through blockade of voltage-dependent calcium channels. They coated as the crude extract of ginger (Zo.Cr) induced a dose-dependent (0.3-3 mg/kg) fall in the arterial blood pressure of anesthetized rats. The vasodilator effect of Zo.Cr was endothelium-independent because it was not blocked by L-NAME (0.1 mM) or atropine (1 micron) and also was reproduced in the endothelium-denuded preparations at the same dose range. These data indicate that the blood pressure-lowering effect of ginger is mediated through blockade of voltage-dependent calcium channels.

11. Cinnamon

Cinnamon is the common kitchen spices used around Asia. It has various health benefits such as, Contains powerful medicinal properties, Loaded with antioxidants, anti-inflammatory properties, protect against heart disease, improve sensitivity to insulin, lower blood sugar levels, effects on neurodegenerative diseases, protect against cancer, prevent bacterial and fungal infections, anti-viral properties.

Shirzad (2012) did a double-blind, randomized, placebo-controlled trial on Cinnamon effects on blood pressure and metabolic profile. The results shown that, Cinnamon caused a statistically significant decrease in mean ambulatory SBP but in a clinically moderate way, and lipid profile was significantly improved. Therefore, cinnamon might be considered a complementary treatment in subjects with S1HTN.

Mousavi (2020), reviewed on Anti-hypertensive effects of cinnamon supplementation in adults. This study found that, Out of 469 citations, 9 trials that enrolled 641 subjects were included. Cinnamon supplementation resulted in a significant reduction in SBP, Greater effects on SBP were detected in trials using ≤2 g cinnamon, which lasted ≥12 weeks and participants aged <50 years' old. DBP was also reduced by using lower doses. They found a significant reduction in both SBP and DBP following cinnamon supplementation in adults. It could be proposed as a hypotensive supplement in hypertension management.

Patil (2021) conducted a study to find out the efficacy of cinnamon consumption for reducing blood pressure in adult hypertensive males. Among 200 male patients with uncontrolled hypertension was conducted to assess the effect of consuming 2 grams of home ground cinnamon powder on blood pressure, weight and anthropometry. Diet diary was maintained by patients and monitored weekly. Clinic blood pressure, height, Weight, WC and hip circumference measured using the NHANES. Cinnamon was found to be effective in weight loss and reduction of systolic and diastolic blood pressure in patients with uncontrolled hypertension. Weight loss, reduced WC and WHR in group ingesting cinnamon was positively correlated with a reduction in SBP and DBP.

Akilan (2023) studied the Effect of short-term administration of cinnamon on blood pressure in patients with pre-diabetes and type 2 diabetes. They found that, Consumption of cinnamon (short term) is associated with a notable reduction in SBP and DBP. Although cinnamon shows hopeful effects on BP-lowering potential, it would be premature to recommend cinnamon for BP control because of the limited number of studies available. Thus, undoubtedly a long-term, adequately powered RCT involving a larger number of patients is needed to appraise the clinical potential of cinnamon on BP control among patients with type 2 diabetes mellitus.

CONCLUSION

There are other number of herbs help in reduction of blood pressure directly or indirectly. We have a various clinical trials about these herbs, still we need trials on human subject. This the way found helpful in the improve AYUSH practice among public, helps in door to door medical care, reduces out of pocket expenditure and also can reduce withdrawal of treatment. The author recommend further research studies on alternative treatment for chronic diseases.

REFERENCES

1. Umar, a., imam, g., yimin, w., kerim, p., tohti, i., berké, b., & moore, n. (2010). Antihypertensive effects of ocimum basilicum l. (obl) on blood pressure in renovascular hypertensive rats. *Hypertension research : Official journal of the japanese society of hypertension*, *33*(7), 727–730. Https://doi.org/10.1038/hr.2010.64
2. Amrani, s., harnafi, h., gadi, d., mekhfi, h., legssyer, a., aziz, m., martin-nizard, f., & bosca, l. (2009). Vasorelaxant and anti-platelet aggregation effects of aqueous ocimum basilicum extract. *Journal of ethnopharmacology*, *125*(1), 157–162. Https://doi.org/10.1016/j.jep.2009.05.043
3. Jamshidi, n., & cohen, m. M. (2017). The clinical efficacy and safety of tulsi in humans: A systematic review of the literature. *Evidence-based complementary and alternative medicine: Ecam*, *2017*, 9217567. Https://doi.org/10.1155/2017/9217567
4. Salve, j., pate, s., debnath, k., & langade, d. (2019). Adaptogenic and anxiolytic effects of ashwagandha root extract in healthy adults: A double-blind, randomized, placebo-controlled clinical study. *Cureus*, *11*(12), e6466. Https://doi.org/10.7759/cureus.6466
5. Lopresti, a. L., smith, s. J., malvi, h., & kodgule, r. (2019). An investigation into the stress-relieving and pharmacological actions of an ashwagandha (withania somnifera) extract: A randomized, double-blind, placebo-controlled study. *Medicine*, *98*(37), e17186. Https://doi.org/10.1097/md.0000000000017186
6. Kushwaha, shalini & betsy, agatha & chawla, paramjit. (2012). Effect of ashwagandha (withania somnifera) root powder supplementation in treatment of hypertension. Studies on ethno-medicine. 6. 10.1080/09735070.2012.11886427.
7. Chandrasekhar, k., kapoor, j., & anishetty, s. (2012). A prospective, randomized double-blind, placebo-controlled study of safety and efficacy of a high-concentration full-spectrum extract of ashwagandha root in reducing stress and anxiety in adults. *Indian journal of psychological medicine*, *34*(3), 255–262. Https://doi.org/10.4103/0253-7176.106022
8. Shi, x., lv, y., mao, c., yuan, j., yin, z., gao, x., & zhang, z. (2019). Garlic consumption and all-cause mortality among Chinese oldest-old individuals: A population-based cohort study. *Nutrients*, *11*(7), 1504. Https://doi.org/10.3390/nu11071504
9. Ried k. (2020). Garlic lowers blood pressure in hypertensive subjects, improves arterial stiffness and gut microbiota: A review and meta-analysis. *Experimental and therapeutic medicine*, *19*(2), 1472–1478. Https://doi.org/10.3892/etm.2019.8374
10. Matsutomo t. (2020). Potential benefits of garlic and other dietary supplements for the management of hypertension. *Experimental and therapeutic medicine*, *19*(2), 1479–1484. Https://doi.org/10.3892/etm.2019.8375
11. Bayan, l., koulivand, p. H., & gorji, a. (2014). Garlic: A review of potential therapeutic effects. *Avicenna journal of phytomedicine*, *4*(1), 1–14.
12. Mishra, shashank & subscription, cr. (2020). A review of super food ajwain and its pharmacological actions. 1. 30-33.

13. Saleem u, riaz s, ahmad b, saleem m. Pharmacological screening of *trachyspermum ammi* for antihyperlipidemic activity in triton x-100 induced hyperlipidemia rat model. Pharmacognosy res. 2017 dec;9 (suppl 1):S34-s40. Doi: 10.4103/pr.pr_37_17. Pmid: 29333040; pmcid: Pmc5757323.
14. Javed, ijaz & khan, muhammad & muhammad, faqir & aslam, bilal & iqbal, zahid & sultan, javed & ahmad, ijaz. (2009). Antihyperlipidaemic efficacy of trachyspermum ammi in albino rabbits. Acta veterinaria brno - acta vet brno. 78. 229-236. 10.2754/avb200978020229.
15. Parati g, bilo g, mancia g. Blood pressure measurement in research and in clinical practice: Recent evidence. Curr opin nephrol hypertens. 2004 may; 13(3):343-57. Doi: 10.1097/00041552-200405000-00013. Pmid: 15073495.
16. Chaudhary, vijay & agrawal, ankita & masand, sameet. (2021). A clinical study to evaluate the effect of jatamansyadi kwatha and shirodhara in the management of hypertension. International journal of research in ayurveda and pharmacy. 12. 4-10. 10.7897/2277-4343.120236.
17. Bhat mda, malik sa. Efficacy of nardostachys jatamansi (d.don) dc in essential hypertension: A randomized controlled study. Complement ther med. 2020 sep; 53:102532. Doi: 10.1016/j.ctim.2020.102532. Epub 2020 aug 14. Pmid: 33066862.
18. Pawar, virendra & shinde, dattatraya & pawar, virendra & dhurve, sanjay & dhurve, sanjay. (2022). To study the efficacy of jatamansi phanta in hypertension. Journal of pharmaceutical negative results. 13. 1856-1861. 10.47750/pnr.2022.13.s01.221.
19. Kasar, effect of jatamansi (nordostachys jatamansi) on blood pressure in rajonivritti kala (menopause), world journal of pharmaceutical research, volume 7, issue 5, 835 841 .
20. Hivale us, bhatted sk, bhojani mk, bhusal n. A clinical study on the effect of *triphaladi kala basti* with *arjuna punarnavadi ghanavati* in the management of essential hypertension. Ayu. 2018 oct-dec; 39(4):250-255. Doi: 10.4103/ayu.ayu_184_17. Pmid: 31367149; pmcid: Pmc6639820.
21. Meghwani h, prabhakar p, mohammed sa, seth s, hote mp, banerjee sk, arava s, ray r, maulik sk. Beneficial effects of aqueous extract of stem bark of terminalia arjuna (roxb.), an ayurvedic drug in experimental pulmonary hypertension. J ethnopharmacol. 2017 feb 2;197:184-194. Doi: 10.1016/j.jep.2016.07.029. Epub 2016 jul 9. Pmid: 27401289.
22. Dwivedi s, chopra d. Revisiting terminalia arjuna - an ancient cardiovascular drug. J tradit complement med. 2014 oct;4(4):224-31. Doi: 10.4103/2225-4110.139103. Pmid: 25379463; pmcid: Pmc4220499.
23. Mishra d, tubaki br. Effect of brahmi vati and sarpagandha ghana vati in management of essential hypertension - a randomized, double blind, clinical study. J ayurveda integr med. 2019 oct-dec;10(4):269-276. Doi: 10.1016/j.jaim.2017.04.001. Epub 2017 dec 11. Pmid: 29242090; pmcid: Pmc6938844.
24. Lobay d. Rauwolfia in the treatment of hypertension. Integr med (encinitas). 2015 jun; 14(3):40-6. Pmid: 26770146; pmcid: Pmc4566472.
25. Hopkins al, lamm mg, funk jl, ritenbaugh c. Hibiscus sabdariffa l. In the treatment of hypertension and hyperlipidemia: A comprehensive review of animal and human studies. Fitoterapia. 2013 mar; 85:84-94. Doi: 10.1016/j.fitote.2013.01.003. Epub 2013 jan 17. Pmid: 23333908; pmcid: Pmc3593772.
26. Jalalyazdi m, ramezani j, izadi-moud a, madani-sani f, shahlaei s, ghiasi ss. Effect of hibiscus sabdariffa on blood pressure in patients with stage 1 hypertension. J adv pharm technol res. 2019 jul-sep; 10(3):107-111. Doi: 10.4103/japtr.japtr_402_18. Pmid: 31334091; pmcid: Pmc6621350.
27. Shayoub, mohamed. (2016). Hibiscus miracle in treatment of hypertension. American journal of pharmatech research.
28. Abdelmonem m, ebada ma, diab s, ahmed mm, zaazouee ms, essa tm, elbaz zs, ghaith hs, abdella ws, ebada m, negida a. Efficacy of hibiscus sabdariffa on reducing blood pressure in patients with mild-to-moderate hypertension: A systematic review and meta-analysis of published randomized controlled trials. J cardiovasc pharmacol. 2022 jan 1; 79(1):E64-e74. Doi: 10.1097/fjc.0000000000001161. Pmid: 34694241.
29. Izadi b, joulaei h, lankarani kb, tabrizi r, taherifard e, sadeghpour a, vali m, akbari m. The effect of green cardamom on blood pressure and inflammatory markers among patients with metabolic syndrome and related disorders: A systematic review and meta-analysis of randomized clinical trials. Phytother res. 2023 feb;37(2):679-688. Doi: 10.1002/ptr.7648. Epub 2022 sep 30. Pmid: 36181264.

30. Verma sk, jain v, katewa ss. Blood pressure lowering, fibrinolysis enhancing and antioxidant activities of cardamom (elettaria cardamomum). Indian j biochem biophys. 2009 dec;46(6):503-6. Pmid: 20361714.
31. Ghazi zahedi s, koohdani f, qorbani m, siassi f, keshavarz a, nasli-esfahani e, aghasi m, khoshamal h, sotoudeh g. The effects of green cardamom supplementation on blood pressure and endothelium function in type 2 diabetic patients: A study protocol for a randomized controlled clinical trial. Medicine (baltimore). 2020 may;99(18):E11005. Doi: 10.1097/md.0000000000011005. Pmid: 32358339; pmcid: Pmc7440108.
32. Fatemeh y, siassi f, rahimi a, koohdani f, doostan f, qorbani m, sotoudeh g. The effect of cardamom supplementation on serum lipids, glycemic indices and blood pressure in overweight and obese pre-diabetic women: A randomized controlled trial. J diabetes metab disord. 2017 sep 29; 16: 40. Doi: 10.1186/s40200-017-0320-8. Pmid: 29026804; pmcid: Pmc5623966.
33. Shirzad f, morovatdar n, rezaee r, tsarouhas k, abdollahi moghadam a. Cinnamon effects on blood pressure and metabolic profile: A double-blind, randomized, placebo-controlled trial in patients with stage 1 hypertension. Avicenna j phytomed. 2021 jan-feb;11(1):91-100. Pmid: 33628723; pmcid: Pmc7885002.
34. Ghavami a, haghighian hk, roshanravan n, ziaei r, ghaedi e, moravejolahkami ar, askari g. What is the impact of cinnamon supplementation on blood pressure? A systematic review and meta-analysis. Endocr metab immune disord drug targets. 2021;21 (5):956-965. Doi: 10.2174/1871530320666200729143614. Pmid: 32727334.
35. Hadi a, campbell ms, hassani b, pourmasoumi m, salehi-sahlabadi a, hosseini sa. The effect of cinnamon supplementation on blood pressure in adults: A systematic review and meta-analysis of randomized controlled trials. Clin nutr espen. 2020 apr; 36: 10-16. Doi: 10.1016/j.clnesp.2020.01.002. Epub 2020 jan 20. Pmid: 32220351.
36. Patil, mansi; patil, vishal. Efficacy of cinnamon consumption for reducing blood pressure in adult hypertensive males. Journal of hypertension 39():P e320, april 2021. | doi: 10.1097/01.hjh.0000748180.50102.97
37. Ranasinghe p, pigera s, premakumara ga, galappaththy p, constantine gr, katulanda p. Medicinal properties of 'true' cinnamon (cinnamomum zeylanicum): A systematic review. Bmc complement altern med. 2013 oct 22; 13:275. Doi: 10.1186/1472-6882-13-275. Pmid: 24148965; pmcid: Pmc3854496.
38. Akilen r, pimlott z, tsiami a, robinson n. Effect of short-term administration of cinnamon on blood pressure in patients with prediabetes and type 2 diabetes. Nutrition. 2013 oct; 29 (10):1192-6. Doi: 10.1016/j.nut.2013.03.007. Epub 2013 jul 16. Pmid: 23867208.
39. Kawatra p, rajagopalan r. Cinnamon: Mystic powers of a minute ingredient. Pharmacognosy res. 2015 jun;7(suppl 1):S1-6. Doi: 10.4103/0974-8490.157990. Pmid: 26109781; pmcid: Pmc4466762.
40. Hasani h, arab a, hadi a, pourmasoumi m, ghavami a, miraghajani m. Does ginger supplementation lower blood pressure? A systematic review and meta-analysis of clinical trials. Phytother res. 2019 jun;33(6):1639-1647. Doi: 10.1002/ptr.6362. Epub 2019 apr 11. Pmid: 30972845.
41. Torabi m, naeemzadeh f, ebrahimi v, taleschian-tabrizi n, pashazadeh f, nazemie h. 133: The effect of zingiber officinale (ginger) on hypertension; a systematic review of randomised controlled trials. Bmj open. 2017 feb 8;7(suppl 1):Bmjopen-2016-015415.133. Doi: 10.1136/bmjopen-2016-015415.133. Pmcid: Pmc5759390.
42. Anh nh, kim sj, long np, min je, yoon yc, lee eg, kim m, kim tj, yang yy, son ey, yoon sj, diem nc, kim hm, kwon sw. Ginger on human health: A comprehensive systematic review of 109 randomized controlled trials. Nutrients. 2020 jan 6; 12(1):157. Doi: 10.3390/nu12010157. Pmid: 31935866; pmcid: Pmc7019938.
43. Crichton m, davidson ar, innerarity c, marx w, lohning a, isenring e, marshall s. Orally consumed ginger and human health: An umbrella review. Am j clin nutr. 2022 jun 7;115 (6):1511-1527. Doi: 10.1093/ajcn/nqac035. Pmid: 35147170; pmcid: Pmc9170469.
44. Ghayur mn, gilani ah. Ginger lowers blood pressure through blockade of voltage-dependent calcium channels. J cardiovasc pharmacol. 2005 jan; 45(1):74-80. Doi: 10.1097/00005344-200501000-00013. Pmid: 15613983.
45. Shirzad F, Morovatdar N, Rezaee R, Tsarouhas K, Abdollahi Moghadam A. Cinnamon effects on blood pressure and metabolic profile: A double-blind, randomized, placebo-controlled trial in patients with stage 1 hypertension. Avicenna J Phytomed. 2021 Jan-Feb;11(1):91-100. PMID: 33628723; PMCID: PMC7885002.
46. Mousavi SM, Karimi E, Hajishafiee M, Milajerdi A, Amini MR, Esmaillzadeh A. Anti-hypertensive effects of cinnamon supplementation in adults: A systematic review and dose-response Meta-analysis of randomized

controlled trials. Crit Rev Food Sci Nutr. 2020;60(18):3144-3154. doi: 10.1080/10408398.2019.1678012. Epub 2019 Oct 16. PMID: 31617744.

47. Rajadurai Akilen, Zeller Pimlott, Amalia Tsiami, Nicola Robinson, Effect of short-term administration of cinnamon on blood pressure in patients with pre-diabetes and type 2 diabetes, Nutrition, Volume 29, Issue 10, 2013, Pages 1192-1196, ISSN 0899-9007, https://doi.org/10.1016/j.nut.2013.03.007.

48. Navid Jamali, Mohammad Jalali, Javad Saffari-Chaleshtori, Mohammad Samare-Najaf, Ali Samareh, Effect of cinnamon supplementation on blood pressure and anthropometric parameters in patients with type 2 diabetes: A systematic review and meta-analysis of clinical trials, Diabetes & Metabolic Syndrome: Clinical Research & Reviews, Volume 14, Issue 2, 2020, Pages 119-125, ISSN 1871-4021,

49. Amir Hadi, Marilyn S. Campbell, Bahar Hassani, Makan Pourmasoumi, Ammar Salehi-sahlabadi, Seyed Ahmad Hosseini, The effect of cinnamon supplementation on blood pressure in adults: A systematic review and meta-analysis of randomized controlled trials, Clinical Nutrition ESPEN, Volume 36, 2020, Pages 10-16, ISSN 2405-4577, https://doi.org/10.1016/j.clnesp.2020.01.002.