




Herbal Treatment of Hypertension: A Literature Review

Muhammad Akram^{1*} , Abid Rashid², Muhammad Talha Khalil¹, Hina Anwar¹, Amna Siddique¹, Nimra Shahid¹, Asli Ozturk Kiraz³, Umme Laila¹, Rida Zainb¹, Gawel Solowski⁴

¹Department of Eastern Medicine, Govt. College University Faisalabad, Pakistan

²Faculty of Medical Sciences, Govt College University Faisalabad, Pakistan

³Department of Physics, Pamukkale University, 20070, Kinikli, Denizli, Turkey

⁴Department of Molecular Biology and Genetics, Faculty of Science and Art, Bingol University, Bingol, 1200, Turkey

ARTICLE INFO

Article Type:

Review

Article History:

Received: 03 Aug 2022

Revised: 29 Aug 2022

Accepted: 12 Jan 2023

Available online: 1 March 2023

Keywords:

Hypertension

Lifestyle modification

Natural plants

Remedy

* Corresponding author:

E-mail: makram_0451@hotmail.com

ABSTRACT

Hypertension becomes the main reason behind various deaths. About 20% of the American population is suffering from hypertension and 33% of these Americans are unaware that they are hypertensive. Consequently, hypertension is sometimes known as a silent killer as well. Hypertension is mostly without any symptoms till the destructive consequences of high blood pressure like myocardial infarction, stroke, renal disorders and visual issues are detected. It's a major risk factor that describes heart attacks and coronary artery disease which sometimes needs coronary artery bypass surgery. High blood pressure is defined as constantly high blood pressure increasing from 140/90 mm HG or even more than this, nowadays it's a very common problem faced by almost everyone and almost billions of dollars are consumed every year to investigate cardiovascular ailments and may dollars are utilized for their medication as well. Because high blood pressure majorly causes cardiovascular and cerebrovascular ailments. Recently, traditional medicine has managed little to decrease the patient ratio with this dangerous ailment. Natural remedies provide very useful ways to reduce the increasing patient ratio with hypertension. Taking supplements such as magnesium, omega-3 fatty acids, CoQ10, potassium, amino acids, taurine, and vitamins C and E have been efficiently utilized in dealing with cardiovascular ailments involving hypertension. The mentioned medicinal plants were effective against blood pressure and other cardiovascular diseases. This review highlights the herbs proven scientifically for the treatment of hypertension.

Please cite this paper as:

Akram M, Rashid A, Khalil MT, Anwar H, Siddique A, Shahid N, et al. Herbal treatment of hypertension: A literature review. Journal of Biochemicals and Phytomedicine. 2023; 2(1): 20-24. doi: 10.34172/jbp.2023.6.

Intorduction

High blood pressure is a frequent disease which is known as hypertension, which is defined as constantly high blood pressure increasing from 140/90 mm HG or even more

than this (Pradeep Singh et al., 2015). Nowadays it is a very common problem faced by almost everyone and almost billions of dollars are consumed every year to

investigate cardiovascular ailments and many dollars are utilized for their medication as well (Manish Agrawal et al., 2010). Because high blood pressure majorly causes cardiovascular and cerebrovascular ailments (Xingjiang et al., 2013).

And becomes the main reason behind various deaths. About 20% of the American population is suffering from hypertension and 33% of these Americans are unaware that they are hypertensive. Consequently, hypertension sometimes known as the silent killer as well. Hypertension is mostly without any symptoms till the destructive consequences of high blood pressure like myocardial infarction, stroke, renal disorders and visual issues are detected. It is a major risk factor at detects heart attacks and coronary artery disease which sometimes needs coronary artery bypass surgery (Jawaid et al., 2011).

For almost the previous two years various researchers either they are international or national both are agreed on the medicinal standards of hypertension and significant advancement has been made in the field of medicine used for hypertension treatment. Antihypertensive medicine which is taken orally proves as momentous against hypertension. Still, the blood pressure standard for patients suffering from hypertension is far from acceptable. The study of Chinese natural medicine for the treatment of hypertension has gotten much research awareness (Xingjiang et al., 2013).

Recently, traditional medicine has managed little to decrease the patient ratio with this dangerous ailment. Natural remedies provide very useful ways to reduce the increasing patient ratio with hypertension. According to research, many ways are successful for the treatment of high blood pressure are diet, exercise, stress, management, supplements and herbs. Annually, many investigations have been done on natural medications for the cure of high blood pressure (Manish et al., 2010). Natural drugs have made great subsidies to industrial medicine formulations assembled now days traditional medicines have been dropping field to new synthetic drugs advertised by researchers and healthcare practitioners to be more efficient and trustworthy (Jawaid et al., 2011). So, there are many natural plants utilized for its treatment such as; barberry, garlic, ginger, ginseng and arjuna which can be carefully utilized as medicines for hypertension (Manish Agrawal et al., 2010). This review study highlights the herbs proven scientifically for the treatment of hypertension.

Types of Hypertension

Primary Hypertension

About 90% to 95 % of people suffer from primary hypertension which is also called essential hypertension; has no particular triggers thus it is the reason behind the high volume of blood (Taler, 2008).

Secondary Hypertension

It is estimated that 5% to 10 % of people have secondary blood pressure and this is because of some inherent ailments such as due to renal damage and muscular diseases because these ailments have the consequences on kidneys arteries and the endocrine system of the body (Taler, 2008).

Causes

These are the main causes of high blood volume.

- CVD (Talha et al., 2011)
- Enhanced activity of the SNS
- Boosted production of hormones that retains sodium and vasoconstrictors
- Lack of vasodilators like prostacyclin and nitric oxide
- Improper and enhanced secretion of renin which results from raised fabrication of angiotensin-II and aldosterone.
- Genetic disposition (Kaplan, 2002; Reddy, 1996).

These under-mentioned causes are also the reason behind hypertension, but they are less common

- Cushing syndrome
- Raised intracranial pressure
- Brain tumors
- Encephalitis
- Respiratory acidosis
- Thyrotoxicosis
- Congenital adrenal hyperplasia
- Polycystic disease
- Diabetic nephropathy

Hydronephrosis (Kaplan, 2002; Reddy, 1996).

Symptoms

Here are the main signs and symptoms of this disease;

- Headaches
- Exertion
- Ears ringing
- Fatigue
- Cardiac palpitations
- Flushed face
- Bleeding of the nose
- Urine retention
- Blurred vision

Dizziness (<http://www.vitapharmica.com/benefits.html>)

Treatment

There are different types of treatment and many drugs are available on the market including:

central α_2 -adrenergic agonists, potassium-sparing diuretics, thiazide, beta-adrenergic, α_1/β -adrenergic antagonists peripheral α_1 -adrenergic antagonists, peripheral adrenergic neuronal blocking agents, central adrenergic neuronal-blocking agents, direct-acting vasodilators, angiotensin-converting enzyme inhibitors, calcium antagonists, tyrosine hydroxylase inhibitors, and angiotensin II receptor antagonists.

All these above-mentioned medicines are utilized as medication for hypertension but these medicines have side effects as well for example the drugs which are act as diuretics can cause muscular twinges, vertigo, fatigue, water deficiency, blurred vision, and heart rate becomes irregular, rashes on the skin, etc. Angiotensin-converting enzyme inhibitors also caused side effects like it causes, kidney failure cough, vomiting, fever, diarrhea, sore throat, skin rash, etc. Calcium channels become the reason behind these below-mentioned side effects as well as tiredness, headache, diarrhea, constipation, and edema.

Therefore, research recommended distinct modifications in lifestyle and the usage of suitable natural medicine for the management of high blood pressure.

So, here are the lifestyle modifications that help to reduce high blood pressure.

- Reduction in stress
- Reduce the intake of alcohol
- Do workouts daily
- Reduce the intake of salt
- Proper dietary habits
- Termination of smoking

Utilization of suitable natural medicine (Bauer and Reams, 1995).

Herbal Medicine Used for The Treatment of Hypertension

Goods that come from plant, animal and mineral sources provide the basis for the treatment of various distinct ailments. According to a recent approximation, almost 80% of people from progressing countries depend upon natural herbs for their treatment of distinct ailments. And these natural herbs come from different plants and animal types. Natural drugs are recently in need and their acceptance is rising progressively. Almost 500 plants along with their medicinal utilization are stated in ancient writing and about eight hundred plants have been utilized in local systems of medicine (Conlin et al., 2000).

Need for natural products rising gradually in western countries as well, due to the bad effects of allopathic medicine. Therefore, several companies that make medicine are now focusing on the synthesis of natural (phytopharmaceutical) drugs (Chopra et al., 1956). Almost 20000 plants have been documented which have medicinal properties. Chemical standards from herbal resources have become easier and have influenced substantially the improvement of new medicine from plants that have medicinal properties (P. A. Cox, 1990) (Richard and Jurgens, 2005). Many natural drugs have been utilized as medicine for the treatment of hypertension some of them are explained below

Arjuna bark (*Terminalia arjuna*)

It is a deciduous plant observed all over India. Its part which is utilized as a drug for the treatment of distinct ailments is its bark & it is used for almost 3 eras. Its chemical components consist of, gallic acid, triterpenoid saponins, magnesium, ellagic acid, phytosterols, flavonoids, calcium, zinc and copper (Singh et al., 1982). It is used in the treatment of distinct ailments such as heart diseases including, coronary artery diseases (CAD), hypertension, CHF (congestive heart failure) stable angina and causes a reduction in systolic blood pressure (Dwivedi and Agarwal, 1994). It has no hepatic, kidney failure and hematological side effects (Dwivedi and Jauhari, 1997).

Hawthorne (*Crataegus*)

Hawthorne is a group of plants from the *Crataegus* family. The plant extracts are a source of medicines that are conventionally utilized for heart diseases. Its main components consist of flavonoids, catechins, triterpene saponins and amines. It works in the reduction of blood

pressure (Leuchtgens, 1993). And it decreases blood pressure by expanding the coronary artery (Schussler et al., 1995).

Black Cumin Seed (*Nigella sativa*)

It is used as a diuretic and blood pressure-lowering agent for a very long time. During an in vivo study, it was noticed that its 0.6 mL/kg/day extract and frusemide dosage of 5 mg/kg/day has diuretic effects as it increased the diuresis by 16% to 30 % after 15 days of its medication correspondingly (Zaoui et al., 2000). It has an antioxidant property therefore it is utilized in several cardiac diseases treatment its chemical components consist of thymoquinone, thymol 32, carvacrol, t- anethole and 4- terpineol (Ghosheh et al., 1999). The blood pressure-lowering effect of these seeds is because of their essential oils. Because in-vivo studies reveal that essential oils are effective and centrally-acting antihypertensive agents (Tahir et al., 1993).

Rauwolfia serpentina

It is the most important herb which has medicinal properties due to its alkaloids which are almost 30 in number. Reserpine is the most important chemical constituent that is present in its root this active agent helps to reduce blood pressure and is also helpful in the treatment of various other heart diseases (Duke, 1985). And the constituents that are used for these purposes are ajmaline, rescinnamine, serpentinine, and sarpagine. Its alkaloids work by manipulating nerve impulses along with particular pathways that affect cardiac and vessels carrying blood and reduce blood pressure as well. It also reduces catecholamines and serotonin from nerves in CNS (Obayashi et al., 1976).

Ginseng (*Panax ginseng*)

It is a very common plant cultivated in China but now it is also present in Japan, Korea and North America. It is generally utilized as an adaptogenic representative for tiredness, lack of sleep, anxiety stress and acts as an immunity booster as well. It enhances the stress on towards environment as well (Attele et al., 1999). Ginseng is utilized to develop somatic and muscular concerts, improving cognitive functions like focus and memory. Its chemical constituents mainly consist of ginsenoside & saponins. It may use as a single drug or with a combination of another plant in the form of polyherbal formulation (Vuksan et al., 2000).

Ginkgo Biloba

Ginkgo biloba mainly use for the brain its part used are fruit and leaves which are utilized for the treatment of dementia, involving, vascular mixed dementia and Alzheimer's. The leaf of Ginkgo is also utilized for conditions linked with cerebral vascular inadequacy, particularly in elders, involving loss of memory, headache, vertigo, dizziness, focus disability and hearing diseases as well (Le Bars et al., 1997). It is utilized orally for the treatment of ischemic stroke. It is utilized for cognitive disorders secondary to depression and to recover sleep patterns in patients with anxiety, depression and chronic fatigue syndrome also treats eye problems,

involving muscular degeneration glaucoma and attention deficit-hyperactivity disorder (Jung et al.,1990) thrombosis, heart disease, arteriosclerosis and angina pectoris. Its chemical constituents consist of flavonoids and glycosides. It is used in the form of polyherbal formulation or it is used single as well. Ginkgo is marketed either as a single herb compound or in combination with other herbs (Maitra et al.,1995).

Allium sativum

Its basic part used is its bulb and it is utilized against various diseases for example it is utilized against hypertension, hyperlipidemia, and atherosclerosis, and utilized in mensural diseases as well. Its leading chemical components consist of allicin, ajoene and organosulfur compounds like S- allyl-cysteine. Fresh garlic holds almost 1% alliin (Siegel et al., 1999). Garlic decreases hypertension by triggering smooth muscle easing and vasodilation (Apitz-Castro et al., 1986).

Conclusion

Hypertension is a life-threatening disease which becomes the main cause of death these days so, to overcome this disease we have to take some beneficial steps, for example, modifying our lifestyle involving taking a healthy and low-fat diet do exercise daily, don't take stress, avoiding cigarette smoking and alcohol taking and adding these natural herbs to diet and use as a medicine as well all these managements will help to reduce blood pressure. By taking supplements such as magnesium, omega3 fatty acids, potassium CoQ10taurine, and vitamins B and C have been efficiently utilized in dealing with cardiovascular ailments involving hypertension. And these above-mentioned natural herbs prove to be effective against blood pressure and other cardiovascular ailments.

Conflict of interest

There is no conflict of interest among the authors.

Acknowledgement

Authors thank you from Department of Eastern Medicine, Govt. College University Faisalabad, Pakistan.

Consent for publications

The authors approved the manuscript for publication.

Funding/support

None.

Authors' contributions

The authors have contributed equally to the writing and publication of the article.

Ethical considerations

Ethical issues (including plagiarism, misconduct, data fabrication, falsification, double publication or submission, redundancy) have been completely observed by the author.

References

- Agrawal M, Nandini D, Sharma V, Chauhan NS. Herbal remedies for treatment of hypertension. *International Journal of Pharmaceutical Sciences and Research*. 2010; 1(5): 1-21. doi: 10.13040/IJPSR.0975-8232.1(5).1-21.
- Apitz-Castro R, Escalante J, Vargas R, Jain MK. Ajoene, the antiplatelet principle of garlic, synergistically potentiates the antiaggregatory action of prostacyclin, forskolin, indomethacin and dypiridamole on human platelets. *Thrombosis Research*. 1986; 1;42(3):303-11. [https://doi.org/10.1016/0049-3848\(86\)90259-8](https://doi.org/10.1016/0049-3848(86)90259-8).
- Attele AS, Wu JA, Yuan CS. Ginseng pharmacology: multiple constituents and multiple actions. *Biochemical Pharmacology*. 1999;58(11):1685-93.
- Bauer JH, Reams GP. Mechanisms of action, pharmacology, and use of antihypertensive drugs, In *The Principles and Practice of Nephrology*, Edited by Jacobson HR, Striker GE, Klahr S. St. Louis: Mosby 1995; 399–415.
- Chopra RN, Nayar SL, Chopra IC. *Glossary of Indian Medicinal Plants Council of Scientific and Industrial Research*. New Delhi. 1956;89. [https://doi.org/10.1016/S0006-2952\(99\)00212-9](https://doi.org/10.1016/S0006-2952(99)00212-9).
- Conlin PR, Chow D, Miller ER, Svetkey LP, Lin PH, Harsha DW, et al. The effect of dietary patterns on blood pressure control in hypertensive patients: results from the Dietary Approaches to Stop Hypertension (DASH) trial. *American Journal of Hypertension*. 2000;13(9):949-55. doi: 10.1056/NEJM199704173361601.
- Cox PA. *Ciba Foundation Symposium 154*. Chichester, John Wiley & Sons. 1990;40:23-7.
- Duke JA. *Handbook of Medicinal Herbs*. Boca Raton, FL: CRC Press Inc; 1985: 401.
- Dwivedi S, Agarwal MP. Antianginal and cardioprotective effects of Terminalia arjuna, an indigenous drug, in coronary artery disease. *The Journal of the Association of Physicians of India*. 1994;42(4):287-9.
- Dwivedi S, Jauhari R. Beneficial effects of Terminalia arjuna in coronary artery disease. *Indian Heart Journal*. 1997;49(5):507-10.
- El Tahir KE, Ashour MM, Al-Harbi MM. The cardiovascular actions of the volatile oil of the black seed (*Nigella sativa*) in rats: elucidation of the mechanism of action. *General Pharmacology: The Vascular System*. 1993;24(5):1123-31. doi: 10.1016/0306-3623(93)90359-6.
- Ghosheh OA, Houdi AA, Crooks PA. High performance liquid chromatographic analysis of the pharmacologically active quinones and related compounds in the oil of the black seed (*Nigella sativa* L.). *Journal of pharmaceutical and biomedical analysis*. 1999;19(5):757-62. <http://www.vitapharmica.com/benefits.html>.
- Jung F, Mrowietz C, Kiesewetter H, Wenzel E. Effect of Ginkgo biloba on fluidity of blood and peripheral microcirculation in volunteers. *Arzneimittel-Forschung*. 1990;40(5):589-93. PMID: 2383302 .

- Kaplan NM. Kaplan's clinical hypertension. Lippincott Williams & Wilkins; 2010. PMID: PMC2650769.
- Le Bars PL, Kieser M, Itil KZ. A 26-week analysis of a double-blind, placebo-controlled trial of the *Ginkgo biloba* extract EGb 761® in dementia. *Dementia and Geriatric Cognitive Disorders*. 2000;11(4):230-7. doi: 10.1159/000017242.
- Leuchtgens H. Crataegus Special Extract WS 1442 in NYHA II heart failure. A placebo controlled randomized double-blind study. *Fortschritte der Medizin*. 1993; 111(20-21):352-4. PMID: 8375791.
- Maitra I, Marcocci L, Droy-Lefaix MT, Packer L. Peroxyl radical scavenging activity of *Ginkgo biloba* extract EGb 761. *Biochemical Pharmacology*. 1995;49(11):1649-55. doi: 10.1016/0006-2952(95)00089-i.
- Obayashi K, Nagasawa K, Mandel WJ, Vyden JK, Parmley WW. Cardiovascular effects of ajmaline. *American Heart Journal*. 1976 Oct 1;92(4):487-96. doi: 10.1016/s0002-8703(76)80049-x.
- Reddy KS. Hypertension control in developing countries: generic issues. *Journal of Human Hypertension*. 1996;10:S33-8. PMID: 8965285.
- Richard CL, Jurgens TM. Effects of natural health products on blood pressure. *Annals of Pharmacotherapy*. 2005;39(4):712-20. doi: 10.1345/aph.1D067.
- Schüssler M, Hölzl J, Fricke U. Myocardial effects of flavonoids from *Crataegus* species. *Arzneimittel-Forschung*. 1995; 45(8):842-5. PMID: 7575743.
- Siegel G, Walter A, Engel S, Walper A, Michel F. Pleiotropic effects of garlic. *Wiener medizinische Wochenschrift (1946)*. 1999;149(8-10):217-24.
- Singh P, Mishra A, Singh P, Goswami S, Singh A, Tiwari KD. Diabetes mellitus and use of medicinal plants for its treatment. *Indian Journal of Research in Pharmacy and Biotechnology*. 2015;3(5):351.
- Sinha M, Manna P, Sil PC. Terminalia arjuna protects mouse hearts against sodium fluoride-induced oxidative stress. *Journal of Medicinal Food*. 2008;11(4):733-40. doi: 10.1089/jmf.2007.0130.
- Taler SJ. Secondary causes of hypertension. *Prim Care*. 2008;35(3):489-500. doi: 10.1016/j.pop.2008.06.001.
- Talha J, Priyanka M, Akanksha A. Hypertension and herbal plants. *International Research Journal of Pharmacy*. 2011;2(8):26-30.
- Vuksan V, Sievenpiper JL, Koo VY, Francis T, Beljan-Zdravkovic U, Xu Z, Vidgen E. American ginseng (*Panax quinquefolius* L) reduces postprandial glycemia in nondiabetic subjects and subjects with type 2 diabetes mellitus. *Archives of Internal Medicine*. 2000; 160(7):1009-13. doi: 10.1001/archinte.160.7.1009.
- Xiong X, Yang X, Liu Y, Zhang Y, Wang P, Wang J. Chinese herbal formulas for treating hypertension in traditional Chinese medicine: perspective of modern science. *Hypertension Research*. 2013;36(7):570-9. doi: 10.1038/hr.2013.18.
- Zaoui A, Cherrah Y, Lacaille-Dubois MA, Settaf A, Amarouch H, Hassar M. Effets diurétiques et hypotenseurs de *Nigella sativa* chez le rat spontanément hypertendu [Diuretic and hypotensive effects of *Nigella sativa* in the spontaneously hypertensive rat]. *Thérapie*. 2000;55(3):379-82. French. PMID: 10967716.