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MANAGEMENT OF HYPERTENSION WITH NATURAL HERBS

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ABSTRACT

Hypertension is most significant public health problem in India. The cause is idiopathic in 90% patients. Around 50% of the population remains undiagnosed. The prevalence of raised BP in Indians was 32.5% (33.2% in men and 31.7% in women) according to WHO estimates 2008. Although the wide gamut of risk factors, was CVD a major underpin is primary hypertension that accelerates its risk. The 7% of global Disability Adjusted Life Years (DALY) loss is because of high blood pressure. In 2025 about 29% of world's population is projected to be suffered from this condition. 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, depression, insomnia, and abnormal heartbeats, fever etc. Hence the present article focuses on different medicinal plants worldwide used for hypertension rather than on medications. The present literature emphasizes on causes for hypertension, its signs, symptoms, preventive measures as well as its safer options of treatments.

KEYWORDS: Hypertension, Primary and Secondary Hypertension, Prevalence, Medicinal plant.

INTRODUCTION

One of the most significant public health problem is Hypertension and a common lifestyle disease today in India, the cause is idiopathic in 90% patients. Around 50% of the population remains undiagnosed. Hypertension is likely to end up being an epidemic in the near future and 1/3 of the population would suffer from hypertension by the year to 2020 according to expert. 100 million patients are with hypertension in India. The prevalence of awareness, treatment, and control of blood pressure (BP) are 25.3%, 25.1% and 10.7% for rural Indians and 42.0%, 37.6% and 20.2% for urban Indians respectively that was overall estimates. High blood pressure (BP) is ranked as the third most important risk factor for attributable burden of disease in south Asia (2010). In India (HTN) exerts a substantial public health burden on cardiovascular health status and health care system.[1] 57% of all stroke deaths and 24% of all coronary heart disease (CHD) deaths in India in directly responsible to HTN. According to WHO rates HTN as one of the most important causes of premature death worldwide. In a systematic analysis of population health data for attributable deaths and attributable disease burden, HTN has ranked second in South Asia only to child underweight for age.[1]

The worldwide data for the global burden of HTN, in an analysis was 20.6% of Indian men and 20.9% of Indian women were suffering from HTN in 2005. The percentage rates for HTN are projected to go up to 22.9 and 23.6 for Indian men and women, respectively by 2025. India have shown the prevalence of HTN to be 25% in urban and 10% in rural people in India analyzed in recent studies. The prevalence of raised BP in Indians was 32.5% (33.2% in men and 31.7% in women) according to WHO estimates 2008. In a multicenter study from India on awareness, only about 25.6% of treated patients had their BP control and adequacy of control of HTN.[2]

One of the major causes of death is being recognized as cardiovascular disease as a major killer in developing nations like India. Although the wide gamut of risk factors, was CVD a major underpin is primary hypertension that accelerates its risk. The 7% of global Disability Adjusted Life Years (DALY) loss is because of high blood pressure. In 2025 about 29% of world's population is projected to be suffered from this condition.

Blood pressure (BP) is managed by several mechanism, such as (nitric oxide, (NO), neural mechanisms, renal-endocrine mechanisms. Many antihypertensive agents, that maintains blood pressure are diuretics, β-blockers, calcium-channel blockers, and blockers of the rennin- angiotensin system, such as angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers etc, these are used separately or in combination to treat this disease but at the other hand antihypertensive drugs have many side-effects as reduced such as renal function, dry cough, Angioedema etc, hence, the management of hypertension by herbal medicine is an alternative.[2]

There are many medicinal plants recommended that was very useful in the treatment or management of hypertension by the natives communities. That provides new areas of research on the antihypertensive effect of medicinal plants.

Medicinal Herbs useful in Hypertension

Table 1: Indicating the medicinal plants and their active constituents.

S.No	BOTANICAL NAME	FAMILY	COMMON NAME	PART USED	ACTIVE CONSTITUENTS
1.	*Allium sativum*	*Amaryllidaceae*	Garlic	Bulb	allicin
2.	*Anethum graveolens*	*Apiaceae*	Dill	Leaves	α-phellandrene
3.	*Apium graveolens*	*Apiaceae*	Celery	Hydroalcoholic Leaf	Apiin and Apigenin
4.	*Avena sativa*	*Poaceae*	Oat	Whole Cereal	Avenanthramides
5.	*Berberis vulgaris*	*Berberidaceae*	Barberry	Fruit	Berberine
6.	*Linum usitatissimum*	*Linaceae*	Flaxseed	Seed	omega-3 fatty acids & alpha-linolenic acid (ALA)
7.	*Cichorium intybus*	*Asteraceae*	Chicory	Leave	flavonoids, polyphenols, carotenoids, anthocyanins
8.	*Cratageus sp.*	*Rosaceae*	Hawthorn	Berry Extract	quercetin and oligomeric procyandins (OPC's)
9.	*Hibiscus sabdariffa*	*Malvaceae*	Gongura	flower	cyanidin diglucoside, flavonoids
10.	*Agathosma betulina*	*Rutaceae*	Buchu	Leaves	Barosma
11.	*Cinnamomum*	*Lauraceae*	Cinnamon	Bark	Cinnamaldehyde

	verum				
12.	*Nigella sativa*	*Ranunculaceae*	Black cumin	Seed Extract	Thymoquinone
13.	*E. cardamomum*	*Zingiberaceae*	Cardamom	seeds	hydroxycinnamon acid
14.	*Rauwolfia serpentine*	*Apocynaceae*	Indian snakeroot	Reserpine Alkaloid	Methylajmaline

1- *Allium sativum* (family- Amaryllidaceae) Common name- Garlic

Garlic truly is such a wonder spice because of its aroma. It's main constituent is allicin which is a potent antioxidant, antibacterial, lowers lipid levels, reduces high blood cholesterol levels, decreases serum glucose and also helps lower blood pressure. It was found that garlic is very effective in reducing blood pressure in individuals with hypertension when compared to a placebo that was analyzed in a 2008 study published in BMC cardiovascular disorder.[3] The fresh raw or dried garlic has more allicin forming potential that produces enhanced cardio-protective properties compared to aged or cooked garlic. So its batter to add more garlic to your diet. If you are not like the taste and smell of garlic, you can buy it in supplement form and take 600 to 900 milligrams of garlic per day to reduce hypertension.[3]

Fig 1. *Allium sativum*.

2- *Anethum graveolens* (family- Apiaceae) Common name- Dill

Dill is an annual herb which familomes under the family Apiaceae. Dill is the only species in the genus Anethum. It is widely grown in Eurasia where its leaves and seeds are used as a herb or spice for flavouring food. It's Fresh and dried dill leaves are widely used as herbs in Europe and central Asia. The fern like leaves of dill are aromatic and that are used as a flavoring agent.[4] It's good that it used in fresh form, sometimes its flowers are also

used. It contains α-phellandrene, dill ether, limonene and p-cymene and also some essential oils that were very useful in reducing the blood pressure.[4]

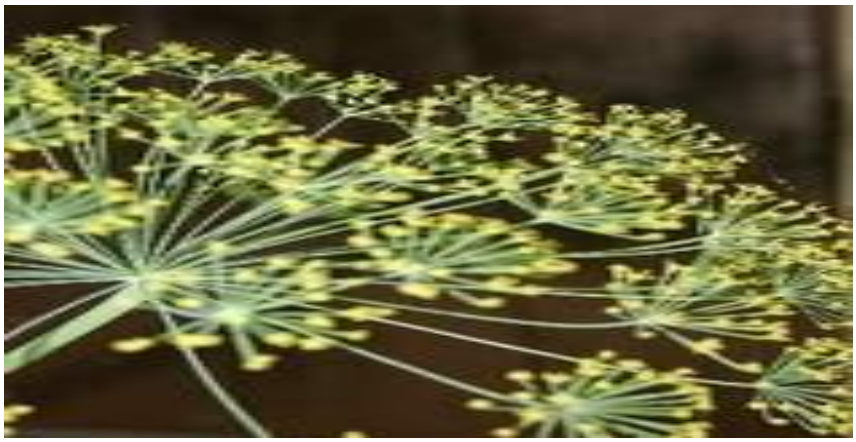

Fig. 2 ***Anethum graveolens.***

3- Apium graveolens (family- **Apiaceae) Common name-** Celery

Leaf of celery is most likely the oldest cultivated form of celery. It is characterized thin skin stalks and a stronger taste and smell compared to other cultivars. It is cultivar from East Asia that grow in marshlands it contains Polyynes (extract) that shows cyto-toxic activities, phenolic acid which is an antioxidant, Apiin and Apigenin can be extracted from celery and parsley, Lunularin is a dihydrostilbenoid also found in common celery, the main constituent responsible for the aroma and taste of celery are butylphthalide and sedanolide.[5] Celery seeds are very effective for the treatment of hypertension in traditional Chinese medicine. studies also proves that celery seeds are very safe and effective treatment for hypertension and celery juice also has a similar effect on lowering the blood pressure because it's a natural diuretic.[5]

Fig. 3 ***Apium graveolens.***

4- ***Avena sativa (family*- Poaceae) *Common name*-** Oat

Avina is a genus of African and Eurasian plant. It belongs the grass family. Collectively it known as the oat, some species was cultivated for thousands of years as a food source for humans and livestock, that was widely spread throught Europe, Asia, and northwest Africa. Oats were used to treat nervous exhaustion, insomnia, and "weakness of the nerves in folk medicine. for the treatment of headache, migraines, shingles and fatigue the tea and tincture of oat straw is very useful. It is also used for the treatment of epilepsy. There is a tradition of using oat straw in baths as a treatment for rheumatism and painful muscles as well as for kidney problems in Europe. Also help to fight inflammation – one of the primary causes of heart disease. It mainly contains chemical constituent called "avenanthramides" which help to reduce levels of inflammatory cytokines,[6] When the levels of cytokines are high, there are chances of diabetes and heart disease. It also contains beta glucan that is very essential to lower LDL cholesterol, According to a Canadian study published in the "European Journal of Clinical Nutrition". It is also help to lower the risk of heart threatening blood clots whilst keeping the arteries flexible too.[6]

Fig.4 ***Avena sativa.***

5- ***Berberis vulgaris (Family*- Berberidae) Common name-** Barberry

Berberis vulgaris commonly known as a shrub which is produces edible but sharply acidic berries. In many countries people eat as a tart and refreshing fruit. The shrub is native to central and southern Europe, and western Asia. It is cultivated as a hedge on farms widely, and it also cultivated because its fruits in many countries.[7] The active constituent of barberry is berberine which inhibits the growth of bacteria and has antioxidant activity. It is also contains isoquinoline alkaloids (berberine) which is very effective in cardiovascular diseases.[7]

Fig. 5 ***Berberis vulgaris.***

6- ***Linum usitatissimum* (*family*- Linaceae) Common name-** flaxseed

Flaxseed also known as common flax or linseed, it is a fiber crop cultivated in cooler regions of the world. The oil extracted from flaxseed is known as linseed oil. Flaxseed is rich in omega-3 fatty acids and alpha-linolenic acid (ALA), that is natural precursor of the cardio-protective long chain n-3 fatty acids.[8] It is also protect heart health by decreasing serum cholesterol and stabilize blood pressure also enhance or improving glucose tolerance. Dietary supplementation with flaxseed oil (8d/day) lowers blood pressure, According to research published in the European Journal of Clinical Nutrition. there's a significant reduction in both Systolic BP and Diastolic BP following supplementation with various flaxseed products, found in another study.[8]

Fig. 6 ***Linum usitatissimum.*** *[11]*

7- *Cichorium intybus (family-* Asteraceae) Common name- Chicory

Chicory is a somewhat woody, perennial herbaceous plant usually with bright blue flowers rarely pink or white. It is also grown as a forage crop for livestock and grows as a wild plant on roadsides and its native Europe, China and Australia where it neutralize widely.[9] This plant is used as diuretic, anti inflammatory, digestive, cardiotonic, and liver tonic in traditional medicine. The other various phytoconstituents reported in chicory are sucrose, cellulose, proteins, caffeic acid derivati ves, flavonoids, polyphenols, carotenoids, anthocyanins, tannins, coumarins, sesquiterpene lactones, fatty acids, pectin, cholins, benzo-isochromenes, alkaloids, vitamins, amino acids, and mineral.[9]

Fig. 7 *Cichorium intybus.*

8- *Cratageus sp. (family-* Rosaceae) *Common name-* Hawthorn

Cretageus is a large genus of shrubs and trees, native to temperate regions of the Northen Hemisphere in Europe and Asia. Hawthorn contain higher amount of flavonoids like quercetin and oligomeric procyandins (OPC's) that increases or boost heart health. These active components reduces the risk of hypertension by reducing arterial blood pressure, also increasing or boosting blood circulation.[10]

Fig. 8 ***Cratageus sp.***

9. Hibiscus sabdariffa (family- **Malvaceae)** ***Common name –*** Gongura

Gongura is a flowering plants, the genus has several hundred species that are native to warm temperature, tropical and subtropical region throughout the world. the chemical constituents in Leaves and stems contain β-sitosterol, stigmasterol, taraxeryl acetate and three cyclopropane compounds and their derivatives.[11] Flowers contain cyanidin diglucoside, flavonoids and vitamins, thiamine, riboflavin, niacin and ascorbic acid. Hibiscus (dried) can b an excellent, all natural herb to manage blood pressure analyzed by an study. A tea made from hibiscus flowers is served both hot and cold, lowered blood pressure on pre-and mildly hypertensive adults who were given 3 cups of brewed hibiscus tea for 6 days when compared to a placebo shown in clinical trial study. In other way it is a natural diuretic, which removes excess sodium from blood and this help to stabilize blood pressure. Additionally, it also mimics the action of angiotensin converting enzyme (ACE) inhibitors which most of drugs prescribed for hypertension management.[11]

Fig. 9 ***Hibiscus sabdariffa.***[14]

10. *Agathosma betulina* (*family*- Rutaceae) Common name- Buchu

Agathosma is a flowering plants, native to the southern Africa. Some of the species of this plant are highly aromatic (good fragrance) genus, and some of genus are used in the herbal medicines. It's a medicinal plant that has been used to lowering blood pressure, and it's a natural diuretic, anti-inflammatory agent that's make safe and effective treatment for blood pressure.[12] Buchu contains flavonoids, vitamins of the B group, tannins, volatile oil, mucilage, diosphenol and it also contains 'Barosma' (camphor) consider the most valuable chemical for medicinal properties. Mainly the active constituents of buchu are concentrated in the plant's leaves.[12]

Fig. 10 *Agathosma betulina.*

11. *Cinnamomum verum (family*- Lauraceae) Common name- Cinnamon

Cinnamon is a small evergreen tree native to sri lanka. Sri lanka still produces 80-90% of the world's supply of cinnamon, which is also cultivated on a commercial scale. Its natural blood sugar and blood pressure lowering abilities.[13] Consumption of cinnamon produces short term, but notable reduction in both systolic and diastolic pressure, and it also recommended for diabetes. Cinnamon consists of a variety of resinous compounds, including cinnamaldehyde, cinnamate, cinnamic acid, and numerous essential oils. Because of its potent medicinal properties it has been used in traditional Indian medicine for thousands of years.[13]

Fig. 11 ***Cinnamomum verum*****.**

12. ***Nigella sativa (family*****- Ranunculcae) Common name-** Blackcumin

Nigella sative also known as kalonji is an annual flowering herb, native to south and southwest Asia. Nigella sativa seeds also known as black cumin, these have been traditionally used as a medicine and also used as a spice.[14] When extract of black cumin seeds used daily for 2 months may have a blood pressure lowering effect in patients with mild hypertension (HT), analyzed by an studies. The main active constituent of Nigella is Thymoquinine that makes the plant very beneficial. In another cases it also helps to reduce LDL cholesterol levels, which also beneficial for cardiac health.[14]

Fig. 12 ***Nigella sativa.***

13. ***E. cardamomum (family*****- Zingiberaceae)**

Common name- Cardamom

Cardamom is a spice made from seeds native to the Indian subcontinent and Indonesia. Sri Lanka is the first reference to trade in cardamom, it is the world's third-most expensive spice. This fragrant spice from India is used in all natural effective way to reduce blood pressure because it's a potent antioxidant property. It's also rich in magnesium and potassium, that

really used to boosts heart health and also reduces blood pressure. 20 newly diagnosed indivisuals with primary hypertension (stage1) were administered approx 3g of cardamom powder in two divided doses for 12 weeks, that is a research of clinical trial in India founds that decreased systolic and diastolic also mean blood pressure at the end of 12th week it also significantly increased fibrinolytic activity.[15]

The essential oil of the cardamom fruit contains terpenylacetat, terpineol, mycrene, limonene, linalylacetat, linalool, sabinene, cineol and hydroxycinnamon acid that also enhance the activity.[15]

Fig. 13 *E. cardamomum.*

14. *Rauwolfia serpentine (family*- Apocynaceae)

Common name- Indian Snakeroot

Rouwolfia serpentine also known as a devil pepper, is a spice of flower native to the Indian subcontinent and East Asia. Rouwolfia is a central nervous system stimulant and also used as a antihypertensive agent. Its roots are used to treat intestinal disorders and also stimulate the uterine contractions.[16] Rouwolfia is a key herb used to treat the mild to moderate hypertension because it contains reserpine as an active components of rouwolfia, it is credited with tranquilizing and antihypertensive properties. It also contain ajmaline has anti-arrhythmic properties which suppress abnormal rhythms of the heart.[16]

Fig. 14 ***Rauwolfia serpentine.***

CONCLUSION

Hypertension, a worldwide illness, is a major factor in cardiovascular diseases that affects a large population of adults. Primary or essential hypertension is an elevated blood pressure due to an unknown or unidentifiable pathology. Secondary hypertension may be caused by underlying pathology or certain medication.

Many allopathic drugs are used for treatment of hypertension But these drugs have some side effect like muscle cramps, dizziness, extreme tiredness, dehydration, blurred vision, abnormal heart rate, skin rash etc. Herbal remedies are still widely used in world for the treatment of hypertension because herbal medicines are harmless as compared to allopathic medicines. The various medicinal plant which are used for the treatment of hypertension are discuss in table. Certain traditional ayurvedic drugs like Nigella sativa, Allium sativum and other 12 species which are mentioned in the table are having equal demand in the current market scenario of India.

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