

## CRITICAL REVIEW ON POTENTIAL AYURVEDIC DRUGS FUNCTIONAL IN HYPERTENSION

Bhokardankar P<sup>1\*</sup>, Rathi B<sup>2</sup>, Kukade S<sup>1</sup>, Gupta R<sup>3</sup>, Bhawane A<sup>4</sup>

1. Datta Meghe Ayurvedic Medical College Hospital and Research Centre, Nagpur, Maharashtra, India
2. Mahatma Gandhi Ayurveda College Hospital & Research Centre, Datta Meghe Institute of Medical Sciences, Wardha, India
5. Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra, India

### ABSTRACT

Hypertension is a lifestyle disorder in the modern era. Mostly the disorder is asymptomatic until it gets diagnosed. Hypertension for a longer duration if gets uncontrolled can cause the problems to the eye, kidney blood vessels, and other organs. It may cause heart attack, kidney failure, or retinal damages. In Ayurveda, there is a number of herbal drugs such as *Elaeocarpus ganitrus*, *Rauwolfia serpentina*, *Terminalia arjuna*, *Nordostachys jatamansi*, *Boerhaviadiffusa*, *Brahmi vati*, etc. used by the Ayurveda physicians to treat the condition of Hypertension. The utility of these drugs both by experimental studies and clinical studies are carried out by researchers. Aim: In the present review paper an attempt is made to identify the potential use of the Ayurvedic drugs as antihypertensive agents. Conclusion: The review finds that the most explored and every now and again used therapeutic plants for the treatment of hypertension are *Jatamansi*, *Sarpagandha*, *Rason*, and *Arjuna*. The review finds that the most explored and now and again used therapeutic plants for the treatment of hypertension are *Jatamansi*, *Sarpagandha*, *Rason*, and *Arjuna*. Moreover, we found that there are logical confirmations of the utilization of some Ayurvedic herbal plants for the treatment of high BP. There should be rational use of these drugs in hypertension and need to increase the demand to all doctors worldwide. There is a need for further research to identify the gaps in previous research studies.

**KEYWORDS:** *Elaeocarpus ganitrus*, *Rauwolfia serpentina*, *Terminalia arjuna*, *Nordostachys jatamansi*, *Boerhaviadiffusa*, *Brahmi vati*.

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### CORRESPONDENCE:

**Prashant S. Bhokardankar\*** ✉ [drprashant44@gmail.com](mailto:drprashant44@gmail.com)

**Address** –Professor, Dept. of Rasashastra Bhaishajya Kalpana, Datta Meghe Ayurvedic Medical College Hospital and Research Centre, Nagpur, Maharashtra, India.

### INTRODUCTION

Hypertension (HTN) is a clinical condition in which blood moves through the blood vessel with more power than regular blood flow hence it is called Blood pressure.<sup>(1)</sup> Blood pressure or hypertension mainly defines if systolic blood pressure is greater than 140 mm of Hg or diastolic blood pressure greater than 80 mm of Hg.<sup>(2)</sup> It is usually higher when people get to wake up, do exercise, or under pressure. Having higher circulatory stress on blood vessels for short time periods is ordinary. Be that as it may, when circulatory stress remains high for a longer duration, it may cause genuine medical conditions.<sup>(3)</sup> Hypertension creates trouble to the heart, blood vessels and builds the danger of stroke to kidney diseases, cardiovascular failure and yet leads to death.<sup>(4)</sup> The disease is indicated by medical experts as a silent killer because sometimes it may be with no symptoms or patient may be ignore the symptoms.<sup>(5)</sup> HTN is accountable for developing stroke in 57% people and 24% of all coronary illness (CHD) problems in India. In an examination of overall information for the worldwide weight of HTN, 20.6% of Indian males and 20.9% of Indian females were experiencing HTN in 2005. It is estimated that cases of HTN in India may rise to 22.9% and 23.6% by 2025. Ongoing studies also predicted that the predominance of HTN in India in metropolitan city will be

25% and in rural area 10%. Thus it is indicative of increasing cases of HTN due to adopting modern life style.<sup>(6)</sup>

In view of the etiology, Hypertension can be classified either essential (fundamental) hypertension or secondary hypertension.

**Primary/Essential Hypertension:** Primary or "basic" hypertension has no known reason, anyway a significant number of the way of life factors add to this condition. Around 90–95% of instances of hypertension are ordered as essential hypertension with no conspicuous fundamental reason.

**Secondary Hypertension:** It can be brought about by some other ailments/issues or the utilization of certain prescriptions. The occurrence of Secondary hypertension is similarly low. The reasons for secondary hypertension include: Kidney infections, (Reno-vascular illness and Chronic renal diseases, and so forth) are the most well-known reasons for Hypertension, Endocrine issues, Pregnancy, Use of preventative pills, and so on.

The current therapeutic strategy involves the use of various pharmacological agents like beta-blockers, Angiotensin-

converting enzyme inhibitors, calcium channel blockers, alpha blockers, and diuretics. However, the use of these drugs is affected because of various hindrances like side-effects and cost-effectiveness.

Ayurveda has been explained by vedic sastras as a science of life. In Ayurvedic texts, we are unable to find a word having resemblance like hypertension. Ayurvedic vaidyas suggesting various names for the same. Vaidyas recommend words like Vyanbala, Rakta chap, Avritavata, Raktaviskhepa for hypertension.<sup>(7)</sup>

Although in emergency medicare Ayurvedic treatment modalities having limitations but there are several Ayurvedic studies available having antihypertensive properties. In Ayurveda compendia number of herbal drugs and compound formulations have been recommended by Ayurveda seers for the management of hypertension. The utility of these drugs have additionally been assessed by utilizing present days various pharmacological exploratory models. In the present paper, attempt has been made to highlight different clinical and pharmacological studies of Ayurvedic herbal drugs having potent hypertensive property.

#### **Aim and objective**

The number of hypertensive patients in society is increasing day by day. The allopathic antihypertensive medications are available as a key drug for the treatment of hypertension. But these drugs are having number of well-known side effects. Today world is attracting towards Ayurveda as an alternative therapy for an ideal and safe treatment for the lifestyle disorders like HTN. The present review article highlighted the antihypertensive activities of Ayurvedic drugs. The main aim of this paper is to find out the antihypertensive efficacy of the Ayurvedic formulations as well as Ayurvedic herbal plants by reviewing previous studies done on hypertension.

#### **MATERIAL AND METHODS**

The main tool used in this study was an internet. On the internet, search focus was done to find out scientific studies done on various Ayurvedic drugs that are working as potent antihypertensive agents. Online available databases were used to search research papers and ancient literature having Ayurvedic drugs working as antihypertensive. For the review only articles in the English language were considered. The main key words used in the internet search for the articles were Ayurvedic drugs, blood pressure, hypertension, herbal plants and Antihypertensive drugs.

#### **SCIENTIFIC STUDIES OF AYURVEDIC DRUGS**

##### **Ajmoda (Carumoxburghianum Graib)**

Rathod et al studied the ajmoda extract in experimental animals and concluded that it can act as a vasodilator and diuretic via calcium channel blocker.<sup>(8)</sup> Madhavi et al in clinical study observed that ajmoda seed can be able to lower systolic blood pressure as well as diastolic blood pressure.<sup>(9)</sup>

##### **Rason (Garlic) - (Allium sativum L.)**

Nwokocha CR et al., observed in an animal study that garlic can significantly reduce the heart rate, as well as blood pressure especially mean arterial pressure. Various pathways were accounted for the function like vasorelaxation, beta adrenoceptor blocking action.<sup>(10-11)</sup> In another study Rasonadileha and Hridrogharchurna possess potent anti-anginal, cardio-protective activity. It can be used effectively in the management or slow down the progress of severe CAD-coronary artery disease, atherosclerosis leading to angina.<sup>(12)</sup>

##### **Jeerak (Black cumin) - Nigella sativa**

Zaoui A, Cherrah et al., compared jeerak with standard modern drug Furosemide and observed that jeerak can act as a good diuretic as well as antihypertensive. It can increase the excretion of Cl<sup>-</sup>, Na<sup>+</sup>, K<sup>+</sup> and urea.<sup>(13)</sup>

##### **Kesar (Saffron) Crocussativus**

Fatehi M et al. have investigated in animals that Crocus sativus petals extract on hypertensive anesthetized rats and reactions of the separated rat's vas deferens and guinea-pig ileum incited by electrical field incitement (EFS). Fluid and ethanol concentrates of C. sativus petals decreased the circulatory strain in a portion subordinate way. Organization of 50mg/100g of fluid concentrate altered the pulse from 133.5+/- 3.9 to 117+/- 2.1 (mm of Hg). EFS of the separated rodent vas deferens and the ileum of guinea-pig evoked constrictions were diminished by watery and ethanol concentrates of petals of Crocus sativus. The watery concentrate (560mg/ml) essentially diminished the contractile reactions of vas deferens to epinephrine (1microM) with no adjustment in withdrawal incited by KCl (300mM). This indicates its antihypertensive activity.<sup>(14)</sup>

##### **Punarnava (Boerhaviadiffusa Linn.)**

A clinical study conducted by Nayak et al. using Punarnava extract. The patients were administered a dose of 250mg twice daily for a period of six weeks. Study revealed that statistically Punarnava can reduce both systolic as well as diastolic blood pressure and act as a potent antihypertensive agent. The additional benefit of punarnava that it can also act as a diuretic.<sup>(15-16)</sup>

##### **Rudrakshya (Elaeocarpus ganitrus)**

Sakat SS et al. studied the Rudrakshya aqueous extract in hypertension induced rats at a dose of 25, 50 and 100 mg/kg. It was observed that elevated blood pressure can be reduced by dose dependant manner. Thus, Rudrakshya proved as a antihypertensive drug with rennin angiotensin activity.<sup>(17)</sup>

##### **Sarpagandha (Rauwolfia serpentina Benth ex. Kurz)**

Vakil RJ et al. have conducted a clinical trial on Sarpagandha in patients of essential hypertension. The treatment was given for the period of week which showed remarkable drop in both systolic as well as diastolic blood pressure. No serious adverse effects were noticed during the treatment.<sup>(18)</sup> In another study Bello Ct et al., Sarpagandha was given to hypertensive patients and observed that Sarpagandha can reduce systolic

blood pressure with an average of 30.7mm of Hg and diastolic blood of 19mm of Hg.<sup>(19)</sup>

#### **Arjun (Terminalia arjuna Roxb.)**

Dwivedi et al. studied the effects of the extract of bark of Arjuna on diverse cardiac disorders including myocardial infarction, angina pectoris, congestive heart failure, hypertension, and coronary artery disease. The Arjuna powder was studied for body mass index, angina frequency, blood pressure. At the end of the study, the researcher concluded that Arjuna can remarkably reduce blood pressure as well as the frequency of angina in heart patients.<sup>(20)</sup>

#### **Gokshura (Tribulus terrestrisLinn.)**

Murthy et al have conducted a clinical on the water extract of the whole plant of gokshura in the form of ghansatva. They concluded the study with the observation that gokshura can act safe diuretic and reduce mild to moderate hypertension in a better manner for a longer duration.<sup>(21)</sup>

#### **Jatamansi - (Nordostachysjatamansi DC)**

Venkata et al., in an open clinical trial, studied antihypertensive patients of Jatamansichurna. It was found that vascular relaxation and drop in cardiac output and marked fall in peripheral resistance.<sup>(22)</sup>

#### **Brahmi Vati and Sarpagandhaghavati**

Dhanpatmishra et al studied double-blind trial of both brahmivati&sarpagandhavati found that both drugs have shown prominent function as antihypertensive.<sup>(23)</sup>

### **DISCUSSION**

Hypertension is considered one of the major medical conditions around the world. A sedentary and modern lifestyle is one of the major causes of hypertension.<sup>(24)</sup> It has been distinguished as one of the significant reasons for death in developing nations. Also, the quantity of patients experiencing hypertension is increasing and potent medication having fewer side effects is demand in all consultants. Over so many years, Ayurveda drugs have been demonstrated to be useful in the conditions like hypertension and improving heart functions. A few medications are demonstrated tentatively yet various are yet to be uncovered. Considering the alarming cases of HTN, In Ayurveda texts, various principles and guidelines are described to make sure the patient's health is a major concern.<sup>(25,26)</sup> This review article archived various Ayurvedic herbal drugs and their pharmacological activities that have been accounted for to be viable in the administration of hypertension in the arena of Ayurveda.

### **CONCLUSION**

The review finds that the most explored and now and again used therapeutic plants for the treatment of hypertension are Jatamansi, Sarpagandha, Rason, and Arjuna. Moreover, we found that there are logical confirmations of the utilization of some Ayurvedic herbal plants for the treatment of high BP. There should be rational use of these drugs in hypertension and need to increase the demand to all doctors worldwide.

There is a need for further research to identify the gaps in previous research studies.

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### **CONFLICT OF INTEREST**

Nil

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Taken from institutional ethics committee

### **AUTHOR CONTRIBUTION**

#### **Bhokardankar P, Rathi B,**

Conceptualization of research paper, Literature search, writing manuscript, Data collection and analysis of the results, Writing and editing of manuscript.

#### **Kukade S, Gupta R, Bhawane A,**

Literature search, Writing manuscript, Data collection and analysis of the results.

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