

Prescribing Patterns of Ayurvedic Formulations in Cardiovascular Disease Management: A Cross-Sectional Survey of Ayurvedic Physicians in India

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ABSTRACT

Context: Affecting in its various forms, cardiovascular disease (CVD) is one of the most challenging public health problems and the leading cause of mortality and morbidity. The holistic and preventive approach of Ayurveda promotes cardiovascular well-being through its interventions. In this study, we attempted to gather information from the Ayurvedic physicians' perspective and their experiences on the most recommended formulations for cardiac disease conditions.

Objectives: This scientific questionnaire-based survey aimed to (1) identify the most prescribed Ayurvedic formulations for CVDs management and (2) provide valuable information about these formulations reported in disease management.

Material and Methods: A cross-sectional, questionnaire-based scientific survey was conducted using a questionnaire circulated to Ayurvedic physicians across India. The questionnaire proforma comprises the demographic details of physicians, along with a few questions based on the cardiovascular disease symptoms observed, prescribed Ayurvedic formulations, information about the patient's beliefs, and overall satisfaction with the provided therapy.

Results: In response to this scientific survey, *Hridayarnava rasa*, *Arjunarishta* (*Parthadyarishta*), *Prabhakar vati*, and *Arjuna ksheerpaka* are found to be the most prescribed Herbo-mineral formulations for treating the various cardiovascular disease symptoms.

Conclusion: With the key formulations for cardiac disease conditions, findings suggest the value of classical preparations in terms of safety, effectiveness, and patient compliance. Profound effectiveness of the therapy with its safety can be achieved if the regimen is followed wisely under the supervision of a practitioner. The survey underscores the need for systematically designed preclinical and clinical studies to establish pharmacological mechanisms and evidence-based validation of these formulations.

Keywords: Cardiovascular diseases; Ayurvedic formulations; polyherbal; herbo-mineral; questionnaire survey.

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Key Messages

This survey identifies the commonly prescribed Ayurvedic formulations for cardiovascular disease management in routine clinical practice across India. The findings provide preliminary pharmacoepidemiological insights into

Introduction

Affecting in its various forms, cardiovascular disease (CVD) is one of the most challenging public health problems and the leading cause of mortality and morbidity. High systolic blood pressure, cholesterol levels, and a high body mass index are the primary cardiovascular risk factors associated with mortality due to cardiovascular diseases (CVDs). Epidemiological projections of 2025 to 2050 reveal that the global burden of cardiac diseases is expected to rise from 20.5 million to 35.6 million, respectively. [1, 2]

Over the past decades, average life expectancy has significantly risen, leading to a simultaneous increase in the aged population. Aging usually affects our appearance, feelings, and physiological functions, as well as it is associated with a decrease in cellular proliferative ability. With aging, the prevalence of cancer, cardiovascular, neurodegenerative, and endocrine diseases also rises.

physician-reported prescribing trends, perceived effectiveness, and patient acceptability. The study may help identify formulations that warrant further pharmacological and clinical investigation through well-designed experimental and clinical studies.

Moreover, the incidence of age-related cardiovascular diseases (for example, atherosclerosis, congestive heart failure, and hypertension) affecting the heart and blood vessels has increased significantly.[3] In a WHO report, more than 80% of all reported CVD deaths occurred in developing countries as compared to developed countries.[4] Ischaemic heart disease will continue as the leading cause of cardiovascular deaths. Simultaneously, high systolic blood pressure, cholesterol levels, and a high body mass index will be the primary cardiovascular risk factors associated with mortality.[2]

The pharmacological approach of managing Myocardial Ischemia mainly focuses on reducing myocardial oxygen demand and improving blood flow to the heart muscle. Treatment may include medications, angioplasty (a procedure to open blocked arteries), or bypass surgery. In long-term management with drugs, inevitable adverse effects are observed like insomnia, tachycardia, headache,

blurred vision, bronchospasm, dry cough, postural hypotension, etc.^[5] This alarming issue becomes worth addressing because it is more concerning from a health perspective and cost-effectiveness among the population. Learnings obtained across various studies and survey data state that the holistic approach of Ayurveda, the ancient Indian medicine system, is attaining greater acceptability worldwide. The specialized section of Ayurveda, '*Rasayan chikitsa*' (rejuvenation therapy), is found to be a crucial supportive measure behind its acceptance, which means to delay aging, rejuvenate the physiological systems, and enhance immunity.^[6] Many traditional natural products with few successful Ayurvedic formulations like *Sarpagandha tablet/ choorn*, *Hridayarnava rasa*, *Arjunarishta*, *Hridyamrit vati*, *Prabhakar vati*, *Brahmi vati*, etc., have been reported to exert a protective effect on the heart and found to be beneficial in mitigating cardiovascular disorders along with diet and lifestyle management.^[7] Most patients are oriented towards Ayurvedic formulations available for treating various diseases and finding them safe. However, only a few scientific studies reflect traditional medicines' efficacy, safety, and acceptability.

In this context, through a scientific survey, we aimed to (1) identify the most prescribed Ayurvedic formulations for CVDs management and (2) provide valuable information about these formulations obtained from previously reported different *in-vitro*, *in-vivo*, and human studies in disease management. Further, the findings of this preliminary study can provide valuable insights to contemporary researchers that could help guide future research work in this direction.

Subjects and Methods

In this study, a cross-sectional, questionnaire-based scientific survey was conducted at Delhi Pharmaceutical Sciences and Research University (DPSRU), New Delhi, in collaboration with Dr. Sarvepalli Radhakrishnan Rajasthan Ayurveda University (SRRAU), Jodhpur, and All India Institute of Ayurveda (AIIA), New Delhi. The study protocol was approved by the Institutional Ethics Committee, SRAU, with protocol no. DSRRAUPGIA/IEC/22-23/678b.

A pre-structured Google form questionnaire proforma was prepared based on an extensive review of the literature.^[8,9] The structured questionnaire was developed following literature review and consultation with Ayurvedic academicians and clinicians. Content validation was performed through expert review by five experienced

Ayurvedic practitioners and academicians for content relevance, clarity, and feasibility prior to circulation. A convenience sampling approach was adopted.

The questionnaire was circulated electronically among 150 Ayurvedic physicians through professional networks and digital communication platforms. Participation in the survey was voluntary, and informed consent was implied by completing the questionnaire. No patient-identifiable information was collected. The questionnaire was structured in four parts. The first section included a cover letter outlining the study's aim and outcomes, encouraging respondents to participate. The second section of the questionnaire was intended to collect participants' demographic details. The third and fourth sections contained 8 and 6 open-ended questions, respectively. The question sections of the proforma address common symptoms of cardiac disorders observed, Herbal and Herbo-mineral formulations prescribed for how long duration and with a combination if any. Formulations found to be effective and adverse effects with that treatment, if reported, were addressed in the questionnaire. Questions from the patient's experience and satisfaction point of view were also inserted in the questionnaire, about how effective, economical, and convenient in terms of dose frequency the patients find the treatment. Patients' degrees of happiness and convenience were scaled up in the questionnaire on a scale of 1 (very dissatisfied/ very inconvenient) to 5 (very satisfied/ very convenient). Descriptive statistical analysis was performed. Data were summarized using frequencies and percentages.

Results

Through this scientific survey, we received 106 responses out of 150 questionnaires, corresponding to 70 % response rate. Respondents represent various regions of India, including Maharashtra, Gujarat, Punjab, Kolkata, Uttar Pradesh, Madhya Pradesh, and Delhi NCR (Figure 1). The number of responses indicated for the most prescribed cardiovascular formulations is prioritized based on treatment effectiveness, patient satisfaction, and cost-effectiveness of the therapy. From the data analysis of obtained responses, we found that 47% of the data reveal the *Hridayarnava rasa* as the most prescribed herbo-mineral formulation in cardiovascular disease management, followed by 41 % of responses for *Arjunarishta* (*Parthadyarishta*) formulation, 40% of responses for *Prabhakar vati* formulation, and 36% of responses were received for *Arjuna ksheerpaka* formulation.

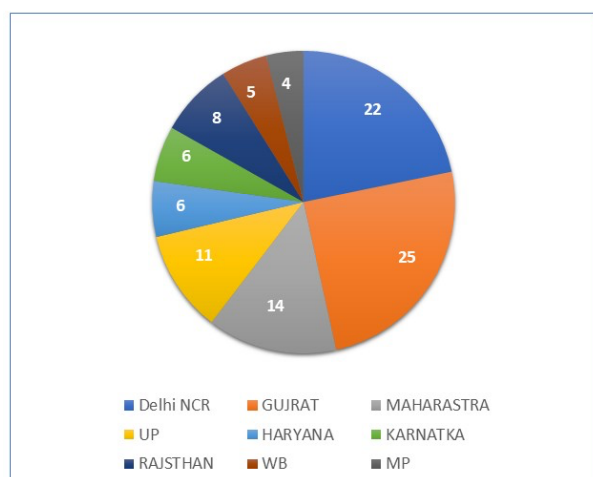


Figure 1: Percentage of responses received from Ayurvedic practitioners in various regions of India for the questionnaire survey about Ayurvedic formulations prescribed in cardiovascular disease management.

The formulations were reportedly prescribed for symptoms and conditions including chest discomfort, palpitation, dyspnea, hypertension, edema, anxiety, and angina-like presentations. Most physicians reported that selection of formulations was based on classical textual references and clinical experience. Respondents generally perceived these formulations as useful in long-term management and economically acceptable for patients. The reported duration of therapy ranged from one month to two to three years, depending upon clinical condition and physician discretion. Most respondents did not report major adverse effects. A small proportion reported mild adverse events, including headache, dry mouth, increased urination, burning micturition, and epistaxis.

Discussion

The present study provides preliminary insights into prescribing patterns of Ayurvedic physicians for cardiovascular disease management in routine clinical practice. The survey findings indicate that *Hridayarnava rasa*, *Arjunarishta*, *Prabhakara vati*, and *Arjuna ksheerapaka* are among the commonly prescribed formulations.

The observed prescribing preferences may reflect the continued clinical relevance of classical Ayurvedic formulations in cardiovascular care. Physicians primarily reported selecting these formulations are based on classical references and cumulative clinical experience. Several ingredients present in these formulations have previously been investigated for antioxidant, hypolipidemic, anti-inflammatory, and cardioprotective activities in experimental and clinical studies.^[10-20] However, the present survey was not designed to evaluate clinical efficacy or establish causal therapeutic outcomes. Therefore, interpretations regarding efficacy and safety should be made cautiously. The survey also highlights the need for systematic pharmacoepidemiological studies evaluating prescription trends, treatment outcomes,

Table 1: Compositions and the reported pharmacological actions of the key formulations for Cardiovascular disease management

S r. N o.	Ayurvedic Formulations	Composition as per	Stand ards	Reported pharmacological effects of the
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adverse drug reactions, and herb-drug interactions in Ayurveda-based cardiovascular disease management. The pharmacological rationale of these formulations, presented here (Table 1), supports their clinical use in CVD management.

Pharmacological Actions Reported for These Key Formulations

1. *Hridayarnava rasa*: Pharmacological and safety studies reported on *Hridayarnava rasa* formulation show that this formulation possesses a significant effect on lipid profile, and it has been explored with emphasis on the presence of Copper (Cu) content, which is believed to be a lipid-lowering agent.^[10,11] Safety studies on Tamra Bhasma and *Hridayarnava rasa* treatment have shown no serious toxic effects, even at a genotoxic level.^[12] The *Triphala* components (*Amalaki*, *Bibhitika*, and *Haritaki*), which are present together in *Hridayarnava rasa* formulation, have been used for thousands of years in traditional medicine systems. As mentioned already in *Charak samhita* and *Sushruta samhita* for its conventional medicine uses, this Ayurvedic medicine *Triphala* possesses a remarkable action for all doshas. Being a keystone of gastrointestinal and rejuvenating treatment, it is potentially effective in maintaining gut microbiome balance and other clinical uses like antioxidant, anti-inflammatory, immunomodulatory, hypoglycaemic, good appetizer, reduces hyperacidity, and so on.^[13] *Solanum nigrum* (*Kakamachi*) present in *Hridayarnava rasa* as one of these active constituents, has been reported to exhibit an antihyperlipidaemic effect in various hyperlipidaemic rat models, inhibiting total cholesterol, triglycerides, low-density lipoproteins (LDL), and increasing HDL level. In Chinese medicine, various studies have reported that *S. nigrum* possesses hepatoprotective and anti-inflammatory activity, and this contribution is expected due to its detoxifying enzymes modulation, antioxidative activity, and free radical scavenging effects.^[14-16]

		Standards		present compositions
1	<i>Hridayarnava rasa</i>	<i>Shuddha parad</i> (Hg), <i>Shuddha</i>	AFI 1, Bh. Ratna vali	Lipid-lowering, antioxidant, anti-

		<i>gandhak</i> (S), <i>Tamra bhasm</i> (Cu), <i>Kakamachi</i> (S. <i>nigrum</i>), <i>Haritaki</i> (T. <i>chebula</i>), <i>Vibhitaki</i> (T. <i>bellerica</i>), <i>Amalaki</i> (E. <i>officinalis</i>)		inflammatory, hypoglycemic, immunomodulatory, rejuvenating, improving lipid profile, hepatoprotective. [10-16]
2	<i>Prabhakar vati</i>	<i>Swarnmakshik bhasm</i> , <i>Lauh bhasm</i> , <i>Abhrak bhasm</i> , <i>Vanshalochan</i> , <i>Shilajit</i> ,	AFI 1, Bhaisajya Ratnavali	Strengthening heart muscle, rejuvenating action, effective in anemia condition (increased blood cell count),

2. *Prabhakar vati*: *Prabhakar vati* treatment in patients is found to be well tolerated and safe, and has a significant impact on the hematological profile, improving lipid profile. *Prabhakar vati* contains a small amount of *Abhraka Bhasma* (calcined mica), which possesses *dhatuposhana* (nourishing to all dhatu), strengthens heart muscles, and *Pranavaha srotas* (respiratory channels). Due to its rejuvenating action, *Abhraka bhasma* helps in improving the blood circulation by thinning the blood vessels of the heart valve. *Makshika* (Copper pyrite) *Bhasma* present in *Prabhakar vati* formulation is found to be effective in anemic conditions. This *bhasma* also possesses *balya* (strength), *yogavahi* (synergistic), and *rejuvenating* properties. With the presence of iron in *Swarnamakshika bhasma*, *Prabhakar vati* has been proven to strengthen the heart muscles and improve blood circulation by increasing the blood cell count. *Bambusa arundinacea*, also called Bamboo (*Vanshalochana*), present in *Prabhakar vati* along with other *bhasmas*, has been reported to possess antidiabetic activity and protective effects against N-methyl-D-aspartate (NMDA)-induced cell death in primary cultured cortical neurons and the anti-plasmin effects determined in fibrin and fibrinogen degradation products (FDPs) assay. Several phytochemical studies of different parts of bamboo and its derived Pyrolyzates with their pharmacological evaluation have claimed that these compounds possess antiapoptotic effects useful as a supplement in ischemic injury treatment.^[17] Supplemented with *Suddha shilajit*, which

		<i>Arjun swaras</i>		improved circulation. ^[17,18]
3	<i>Arjunarishhta</i> (<i>Parthadya rishta</i>)	<i>Arjuna tvak</i> , <i>Mrdvika</i> (<i>Draksha</i> /dry grapes/Munakka), <i>Madhuka</i> , <i>Dhataki</i> /Gud, Water for decoction	AFI 1: Asava and Arista, 34-101	Reducing oxidative stress, inotropic effect due to Ca^{+2} abundance, lowering blood pressure (Cholinergic and beta-adrenergic agonist), hypolipidemic. ^[19,20]
4	<i>Arjuna ksheerpaka</i>	<i>Arjuna churna</i> , Almond milk, Water, <i>Misri</i> (1:8:32)/(1:15:15)	Bhaisajya Ratnavali, Chap. 33	Reducing oxidative stress, inotropic effect. ^[20]

possesses rejuvenating and synergistic actions, *Prabhakar vati* has been reported for significant reduction of serum triglyceride levels, cholesterol, LDL, and VLDL cholesterol levels and improvement in HDL cholesterol level.^[18] *Abhraka bhasma*, *Vaikranta bhasma*, *Swarna makshika bhasma*, *Vimala bhasma*, and *Shilajatu* help in myocardial damage conditions because of their rejuvenating and strengthening action, which helps in strengthening the heart muscles. Hence, *Prabhakar vati* is indicated in the condition of *Hrudshula* (cardiac pain).

3. *Arjunarishhta*: In classical texts, Ayurveda delineates using *Arjuna* (*Terminalia arjuna* W. & A., *Combretaceae*) for managing different ailments such as dyslipidemia, congestive heart failure, hypertension, and anginal discomfort. Used in powder form, bark decoction, or with milk, *Arjuna* has been proven as a potent cardioprotective remedy mentioned ever since the *Vedic* period. Major phytoconstituents like triterpenoids and flavonoids present in *Arjuna* are attributable to reducing oxidative stress and showing a potential impact on ischemic cardiomyopathy. Moreover, its inotropic effect is attributed to the Ca^{++} abundant in the plant. Additionally, research suggests that *Arjuna's* ability to reduce blood pressure may be related to its direct impact on the heart muscle or cholinergic and adrenergic beta-2 receptor agonistic actions. Hence, the beneficial effects of *Arjuna* are mediated through its antioxidative, anti-ischemic, hypolipidemic, and antithrombotic activity, substantiated in various

experimental and clinical studies, revealing no any kind of toxicity or severe side effects with *Arjuna therapy*.^[19, 20] Metals and minerals are used profusely in the practice of Ayurveda after proper incineration by *Bhasma*. As per a few practitioners' responses, the exceptional condition of minor undesired effects sometimes happens if *Tamra Bhasma* is not appropriately prepared and if not given in suitable conditions with suitable adjuvants. However, this is a concern to be explored in the future and researched.

Taken together, the physicians' responses and their insights into patients' treatment experiences indicate a favourable perception of the therapy, reflecting its perceived safety, effectiveness, affordability, and overall patient satisfaction, thereby supporting its potential value in clinical practice.

Limitations

The present study has several limitations. Convenience sampling may have introduced selection bias. Responses were perception-based and dependent on physician recall. Questionnaire validation was limited to expert review, and no inferential statistical analysis was performed. In addition, clinical efficacy and safety outcomes were not independently verified. Therefore, the findings should be interpreted as exploratory observations rather than confirmatory evidence.

Conclusion

The present study emphasizes the prevailing Ayurvedic practice patterns among physicians for managing cardiovascular diseases. The outcomes obtained in this survey analysis show that *Hridayarnava rasa*, *Arjunarishta*, *Prabhakar vati*, and *Arjuna ksheerpaka* were among the most frequently reported formulations.

The findings primarily represent the physicians' perceptions and prescribing trends and should not be interpreted as conclusive evidence of efficacy or safety. Further well-designed pharmacological, observational, and clinical studies are required to systematically evaluate these formulations and establish their evidence-based clinical utility.

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