

Ayurveda: Controversies and the Need for Integration with Mainstream Medicine

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ABSTRACT

Ayurveda has often been labeled a pseudoscience due to a lack of understanding regarding its principles, which are difficult to translate into mainstream medical terminology. Furthermore, there have been controversies due to a few biased and flawed studies that claim some of the metals it uses are toxic and cause other side effects.^{1,2} The lack of randomized, controlled trials has only increased the public's distrust. This paper attempts to address these challenges by introducing the concepts of Ayurveda and comparing it with mainstream medicine in order to bring to the readers' notice the pros and cons of both forms of medicine. The paper begins with an analysis of the different approaches in the understanding and treatment of a disease in Ayurveda and mainstream medicine. This is followed by studies supporting the efficacy of the herbs used in Ayurveda. Next, the use of metals in Ayurveda and its purity is discussed. Finally, this paper mentions the lack of quality control and regulations in Ayurveda and the steps being taken to address this issue. The paper concludes with an argument for the integration of Ayurveda into mainstream medicine.

INTRODUCTION

Originating in India, Ayurveda is one of the oldest systems of medicine in the world. It combines the Sanskrit words *ayur* (life) and *veda* (knowledge).³ There are three basic principles guiding Ayurveda. The first principle is that human beings are a miniature cosmos of the universe composed of the same five elements (earth, water, fire, air, space) in different proportions which contribute to an individual's uniqueness that in Ayurveda is termed *prakriti*.³ The second Ayurvedic principle is a powerful body-mind connection in which the two are not separate entities but rather interact with each other and play an important role in maintaining the health of an individual. The third principle is that an individual has the capability to heal themselves from within, building up their immunity and optimal functioning of all their systems, by utilizing the vast resources of nature including herbs, minerals, proper diet and lifestyle.³

Comparison of the concept of disease in Ayurveda with mainstream medicine.

According to a medical dictionary, a disease is defined as "any deviation from or interruption of the normal structure or function of any part, organ, system that is manifested by a characteristic set of symptoms and signs whose etiology, pathology, and prognosis may be known or unknown."⁴ In the Ayurvedic tradition, a disease is the

result of an imbalance in the proportions of doshas in an individual. *Doshas* are responsible for the physiological, physical and emotional characteristics in an individual contributing to their uniqueness or *prakriti*. Doshas form the three governing energies (*Vata*, *Pitta*, *Kapha*) composed of two of the five elements (*panchmahabhutas*: earth, water, fire, air, space) depicted in Fig. 1.

Pitta constitution of an individual has the qualities of fire and water. For instance, the hot and spreading qualities of fire correlates with an individual's dynamic, ambitious nature and strong digestion. The water qualities control the fire qualities in a balanced *Pitta* individual. In an imbalanced *Pitta* individual, these qualities become pronounced to make an individual aggressive and hot tempered, with a tendency to get heartburn, ulcers, hives. In *Kapha* constitution, the heavy and static qualities of Earth correlate with the individual's big build and tendency to be overweight, lethargic and diabetic. The smooth qualities of water in *Kapha* correlates with the individuals' healthy look and smooth, supple skin. In *Vata* individuals, the dry, expan-

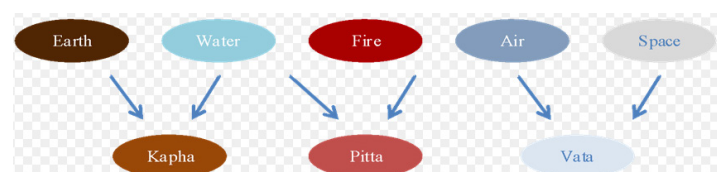


Figure 1. Doshas and their corresponding elements



Figure 2. Factors influencing balanced Kapha

sive and light qualities of air translate to the individual's energetic nature and slim body, but in an imbalanced state, they cause nervous temperament, dry skin, constipation, insomnia and Parkinson's. Only one or two of the qualities of each element are mentioned above as the topic requires a much deeper and lengthy explanation which is beyond the scope of this paper. According to Ayurvedic principles, in a healthy individual, there is a balance in the proportion of *doshas* present according to the individual's constitution or *prakriti*. When the proportion of a particular dosha or doshas in an individual increases, an imbalance is created which manifests in the form of disease. The imbalance is caused by a number of factors, with an improper diet and lifestyle being the most common, as shown in Fig. 2.

The approach in finding the cause and treatment of the disease in mainstream medicine is to focus on specific parts of the system. Rogenmortel indicates in his paper that this approach has been very successful, though the complexity of the biological system has been underestimated in the treatment of diseases.⁵ In one study, Hankey has described mainstream medicine as being

“wedded to the idea that, if cause and effect theories are to be properly articulated, tiniest components must

be considered most fundamental, then building larger structures out of smaller ones. The primary objective of Ayurveda is to describe integration of systems, while for Mainstream medicine, it is the description of structural components and their individual function.”⁶

In Ayurveda, the root cause of any disease is due to stress or poor digestion.³ According to Ayurveda, whenever the digestive fire (*agni*) is weak, too strong or irregular, the digestion is incomplete and the undigested food remains in the gut forming toxins (*ama*).³ The digestive fire can be correlated to the action of the digestive enzymes. As mentioned above, another major root cause of disease is stress, which can manifest itself as psychological or physiological symptoms. The disease pathways which can take place in Ayurveda are depicted in Fig. 3.

Though recently, mainstream medicine has started correlating the connection of stress and gut problems with a number of diseases.^{7,8}

Ayurveda utilizes a holistic approach in the treatment of any disease, which considers the whole body and mind for any problem where different tissues or system in the body interact with each other and are not separate entities. The holistic, comprehensive approach towards treating each individual is primarily at two levels. The first approach requires fixing diet (*ahara*) and lifestyle (*vihara*) according to the individual *dosha*.³ The second approach, aside from taking care of the *ahara* and *vihara*, requires treatment with herbs (*shamana*), detoxification known as panchkarma (*shodhana*) or both. The initial stages of a disease can simply be fixed by correcting the *ahara* and *vihara*, while later stages and more complex diseases require a combination of these two approaches.⁹⁻¹¹ The treatment for any disease in Ayurveda is to fix the digestive system, remove stress and also act on the imbalanced doshas. This is achieved by herbs which target the mind and the imbalanced dosha as depicted in Fig. 4.

The mainstream doctors have become increasingly aware of the importance of diet and lifestyle in combination with the treatment for certain diseases such as diabetes and hypertension.¹²⁻¹⁴

DISCUSSION

Importance and the indispensability of mainstream medicine.

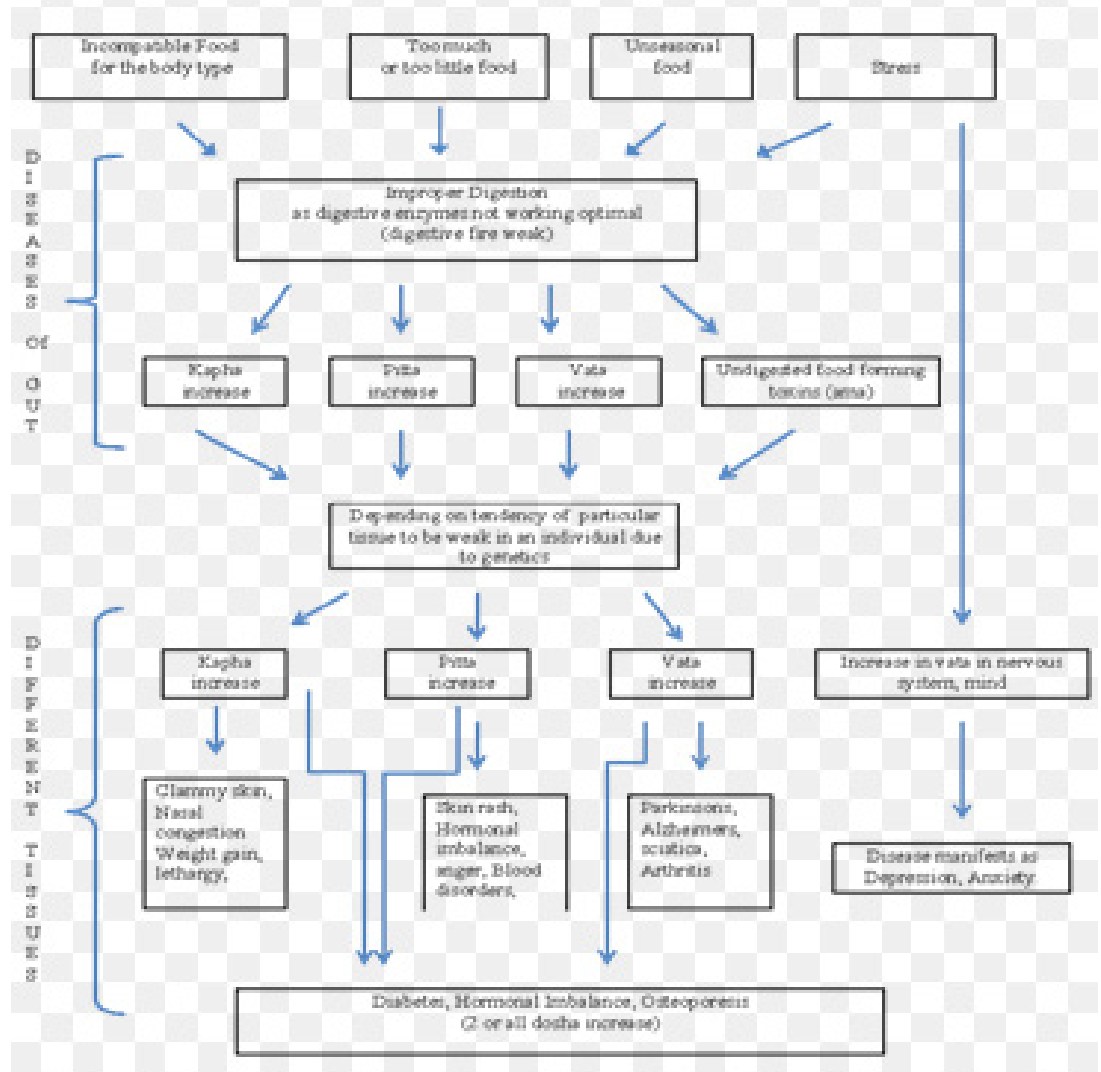
Further comparing Ayurveda and mainstream medicine, it is apparent that mainstream medicine is irreplaceable. Some examples where mainstream medicine is indispens-

Figure 3. Disease pathway in Ayurveda

able is in the diagnosis of diseases, treatment during emergencies, structural problems, bacterial infections and providing instant relief. In chronic diseases such as rheumatoid arthritis and other autoimmune diseases, mainstream medicine uses painkillers or steroids for relief of the symptoms which may cause side effects and dependency to the medicines.¹⁵⁻¹⁹ Ayurveda has been treating chronic diseases such as osteoporosis, rheumatoid arthritis, diabetes, eczema, psoriasis and Parkinson's as well as psychological problems such as depression and anxiety with positive results which will be discussed later in the paper.

The use of herbs vs the active component of the herbs.

Due to little documentation of the active component of the Ayurvedic herbs and a lack of understanding of their mechanism of action, there have been doubts regarding the validity of the effectiveness of Ayurvedic medicines.²⁰ Recently, there has been research on finding the active component for a number of Ayurvedic herbs, mechanism of their action and the effectiveness of treating diseases which are summarized in Table 1. Although the documentation on the active component of herbs is being done, it is either the whole herb or combination of herbs that are used in the treatment of diseases in Ayurveda, rather than just the active component of the herb. Due to the use of the whole herb or combination of herbs in Ayurvedic formulation, Luthra et al. objects that there is the possibility of interactions between the potential bioactive ingredients of the herbs, causing an indistinct compartmentalization between herbs in Ayurvedic medi-



cines.²⁰ Dr. Stephen Buhner has explored the interaction between the bioactive ingredients of herbs, coming to the same conclusion:

“Herbs are much more elegant medicinal agents than pharmaceuticals in that they contain hundred to thousands of complex compounds that work together synergistically when confronted by disease organisms. The plants have been here much longer than people and they have developed extremely sophisticated responses to infections. when we take them internally, those responses are medicines for us. The very nature of stealth pathogens and their wide impacts on the body make herbs a very useful approach.”⁴¹

In Ayurveda, this statement has been true for thousands of years, where the combined effect of various herbs or the whole herb is responsible for the therapeutic efficacy rather than action of a single active ingredient.⁴² The effectiveness of the whole herb instead of the active component has

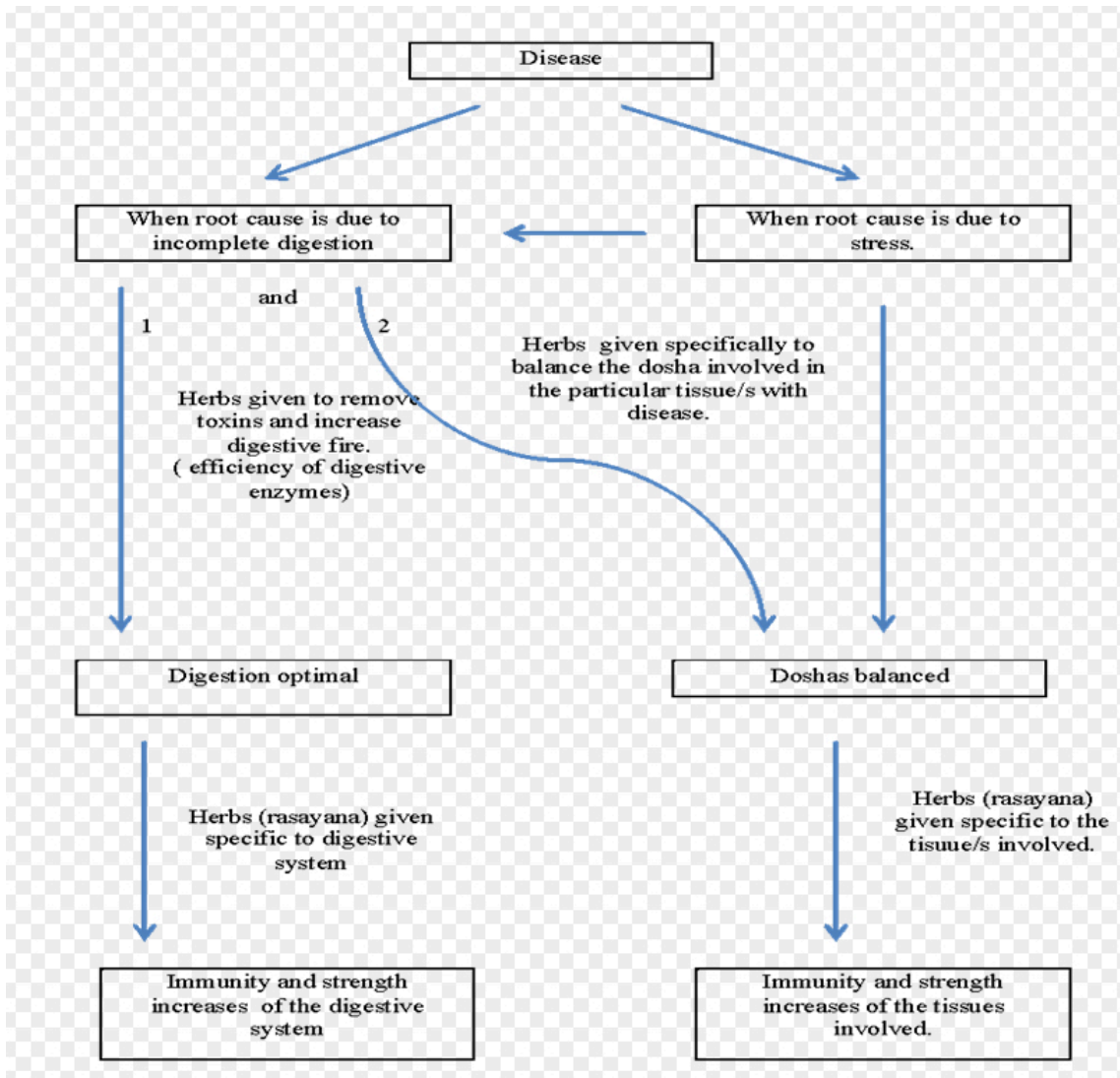


Figure 4. Protocol for any disease in Ayurveda

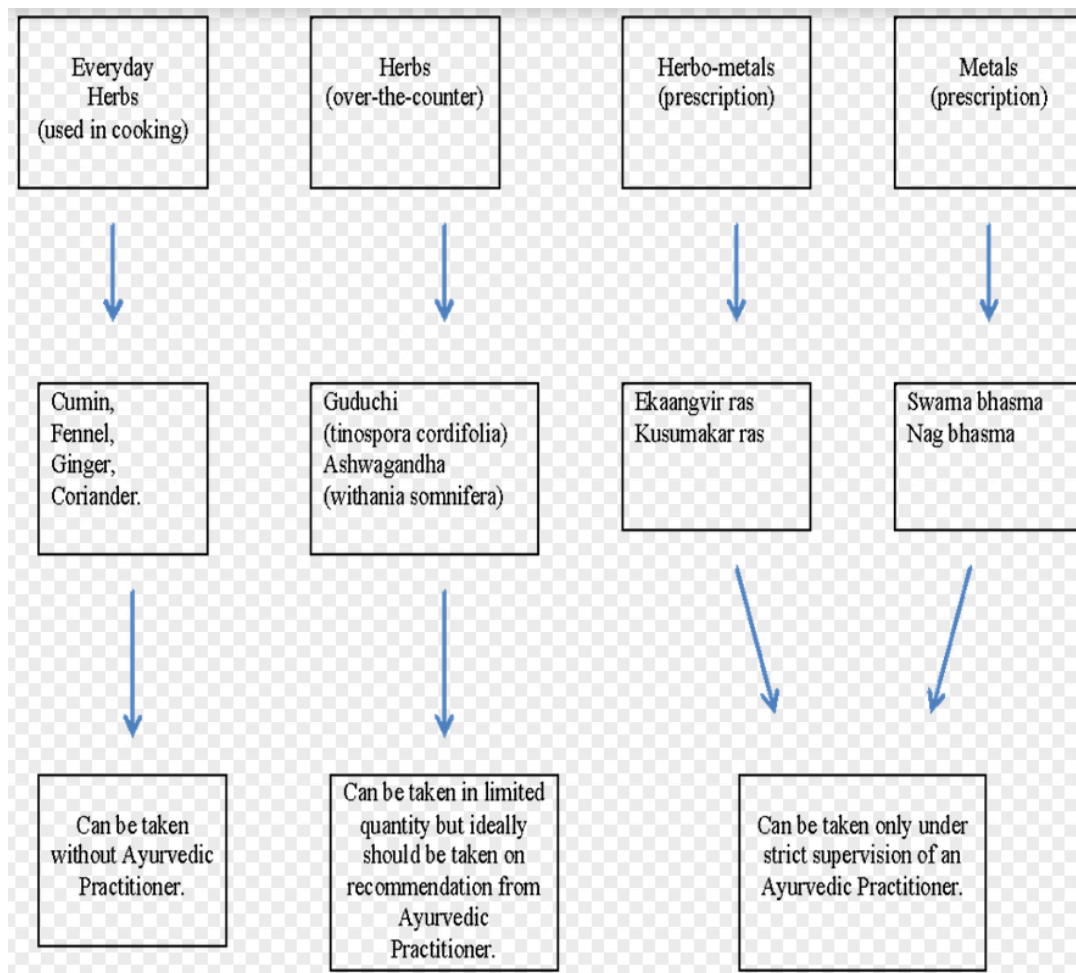
effective as an immunomodulator, anti-inflammatory agent or as an antioxidant.^{43,44} In malaria, it has been found that the whole plant or a mixture of plant extract have greater antiplasmodial activity than the isolated constituents at an equivalent dose.⁴⁵ The extracts contain substances that also inhibit multi-drug resistance which has become a problem with using only the active constituent.⁴⁵ More research should be done on the efficacy of other Ayurvedic herbs and formulations compared to their corresponding active component. *Studies to prove the*

been shown in case of the well-researched, much publicized curcumin which is the active component of turmeric.⁴³ Turmeric is used as an immunomodulator, anti-inflammatory agent or as an antioxidant.⁴³ Curcumin alone is not effective as its bioavailability or effectiveness is very low due to low absorption, high rate of metabolism and rapid elimination and clearance from the body.⁴³ Turmeric, which is lipophilic, has been used effectively for centuries with milk, oil and other spices in Indian cooking. It has been shown that ethanol extract of turmeric had a better anti-inflammatory, immuno-stimulatory action than commercial curcumin.⁴³ This suggests the presence of other compounds in the total extract which may help with the utilization.⁴³ The anti-inflammatory markers were increased more in turmeric as compared to curcumin either due to the bioavailability or a stronger effect of turmeric.⁴⁴ All these studies on curcumin prove that the single active component from the herb is not

positive claims in Ayurveda.

The reason for the lack of RCT (randomized controlled trials) is the difficulty to comprehend the exact efficacy of the herb or formulation as Ayurvedic medicine does not use a single active component of an herb. RCT require a large number of patients, standardized medicine with or without placebo and inclusion/exclusion criteria of subjects. The RCT criteria of double blinded study are not easily met when it comes to Ayurveda due to the difficulty in making the participant "blind" due to the distinct odor and taste of Ayurvedic herb.⁴⁶ Besides the individualized nature of Ayurvedic treatment, Ayurvedic herbs are collected during different seasons which impact the effectiveness of the herb.⁴⁷ Ayurveda treatment encompasses a large number of variables; besides the individualized approach to the herbs given, it includes modification of diet, lifestyle as well as

Figure 5. Types of medicines



changes in medication during the course of treatment. In a typical disease management in Ayurveda, medication is changed due to the changes in the doshas with the intake of Ayurvedic herbs (Fig. 4). For instance, in eczema, when the skin is oozing and itchy, according to Ayurveda, the disease is in the *Kapha* and *Pitta* stage, so the herbs are given to balance the mentioned *doshas*.³ The oozing skin is due the increased

Kapha, the sticky mucus like substance which is a representation of the earth and water elements in *Kapha*. The itchiness is due to the increased *Pitta*, which is due to its fire and air element qualities. When the oozing stops, the itching and dryness is considered *Pitta* and *Vata* stage where the medication is changed to balance *Pitta* and *Vata doshas*. The dryness is due to the qualities of air and space elements of the increased *Vata*. As the itching stops, dryness alone becomes the *Vata* stage, further changing the course of herbs which target to balance *Vata*. Lastly when the dryness is over, herbs (*rasayana*) are given to strengthen the system so the disease does not recur. These herbs act specifically to increase the immunity of the particular system, in this case the skin.³

Besides, the majority of the chronic diseases have to be supported with a combination of Ayurvedic herbs. Long-term, observational individual case studies which will document the use, safety, effectiveness of the herb should be used. Retrospective studies should be done as thousands of cases are available in various Ayurvedic centers/hospitals. Few have suggested a circular model instead of a hierarchical model for holistic medicines such as Ayurveda, Traditional Chinese Medicine (TCM), Homeopathy and

Unani.^{48,49} For Ayurveda, it makes sense that “the important question is not whether study is randomized or not, but whether study uses a method well suited to answer a question and whether it implements its method.”⁴⁸ Nevertheless, few of the studies undertaken for Ayurvedic herbs and formulations are mentioned for chronic diseases as shown in Table 2.

Types of Ayurvedic medicines and the controversy regarding metals in them

Ayurveda has four types of medicines,³ as shown in Fig. 5. First are the herbs that are used in everyday life, like in cooking, which can be used without the advice of Ayurvedic. Next, there are herbs that have only medicinal value and cannot be used daily without the advice of Ayurvedic practitioners as the dosage, timing, and dietary regulations have to be taken into account. The third are the herbometals, and lastly there are metal based medicines. The latter two can be used only on strict supervision under an Ayurvedic doctor. Both are very potent and fast acting, but can have severe side effects if taken without the guid-

ance of an Ayurvedic doctor. They can be compared to steroids or antibiotics in mainstream medicine as all of them are extremely potent and can cause side effects without the proper dosage and guidance of a doctor.

There has been a lot of controversy regarding metal content of, and toxicity in, Ayurvedic medicines. Saper et al. found metal content in Ayurvedic medicines which were purchased from grocery stores in the USA.¹ However, the design of experiment in the study was flawed as the Ayurvedic medicines which were listed to contain only herbs should have been included, while the Ayurvedic medicines that were listed to contain metals with the herbs should have been excluded. Later, the same author taking into consideration the different types of Ayurvedic medicines compared heavy metal content in herbal and non-herbal (containing metals) Ayurvedic medicines from the US and Indian manufacturers.² He found that most of them including the herbal medicines had a higher dosage of metals compared to the daily acceptance allowance of metals in dietary supplements as given by ANSI173. Though the author acknowledged that the results were affected as the herbs that showed prevalence of metals were not assessed for batch-to-batch variability in metal concentration.² In another study, comparing metal content in herbal products including Ayurvedic medicines and pharmaceutical medicines, it was found that a few herbs in both categories had some level of contamination.⁵⁴ Herbs have been found to be contaminated with metals due to leaching of heavy metals into the ground and hence to the herb.⁵⁵ It has been found that leaves contain more metal concentration than roots, bark and least in the seeds.⁵⁵ There is also a possibility of contamination during storage of the herbs under unfavorable conditions.⁵⁶ Another concern has been the use of heavy metals in Ayurvedic medicines. The toxic nature and side effects of these medicines have always been a question. Recently, the same author confirmed that mercury used in Ayurveda is in its inorganic form and that the relative bioaccessibility of mercury was found to be lowered by 29 to 900 times, reducing them to acceptable levels.⁵⁷ In the study where Saper et al. compared herbal and non-herbal medicines, the author acknowledged not ascertaining the specific physical form or chemical species of the metals; it did not consider the *bhasmas* (metals) being in inorganic forms which have been shown to be non-toxic.²

The Question Arises: Why do we Use Metals at All?

In Rasa Shastra (the branch of Ayurveda dealing with

metals), metals are prescribed in minute doses (i.e. 15-250 mg/day) in which they are readily absorbable, adaptable, assimilable and non-toxic (*rasibhava*).⁵⁸ Due to their ability to act as a catalyst, increasing metabolism at a cellular level (*agnideepana*), capacity for targeted and controlled drug delivery and immunomodulatory qualities, they are very useful in treating autoimmune disorders.⁵⁸ The *bhasmas* are produced by *shodhana* a rigorous process by which the toxicity of the metals is removed by processes like multiple trituration, and heating of the raw metals to high temperatures, which removes unwanted parts from the raw material and separates the impurities.^{59,60} These processes are repeated anywhere from seven times to as many as 100 times to make sure the heaviness or toxic effect of the metal is nullified.⁶¹ The reason for nontoxic nature of metals (*bhasma*) is because the metals in Ayurvedic formulation are not present in elemental form but in inorganic form.⁵⁹ In contrast, the organic forms like methyl mercury found in fish are very toxic as they cross the blood-brain barrier and affect the nervous system.^{62,63} *Bhasmas* can be correlated to the nanomedicines as the particle size ranges from 2µm for gold (*swarna bhasma*) to 5- 50nm for the other *bhasmas*,^{58,64} which gives them the qualities of quick action and being very potent.

To check the non-toxicity of these formulations, it was shown in a prospective study of 86 patients with rheumatoid arthritis who were given *Makardhwaj* which has mercury, sulfur and gold, for three weeks. Besides significant reduction in symptoms and RA factor, there was an increase in urinary mercury suggesting elimination of mercury from the system. There was no change in liver and kidney function in all the cases.⁶⁵ To evaluate safety of mercury based Ayurvedic formulations, a study was done on rats where it was found that the mercuric chloride group showed necrosis of neurons in cerebrum, inflamed periportal zone in liver and disruption of epithelium in proximal convoluted tubules in kidney. In comparison there was no abnormal histopathological change in the group given required dose of *Makardhwaj* which is herbometal containing mercury.⁶⁶ No increase in hepatic or renal damage or any other toxicity was found in the usage of *mahayograj guggul*, which is a herbometal ayurvedic formulation, in an observational study of 163 subjects for a maximum of 4 months.⁶⁷ These studies show the non-toxicity of metals in Ayurvedic medicines as well as their efficacy in treating chronic diseases.

Why Ayurveda Seems to Fail

Unfortunately, most patients resort to Ayurveda when they are in the last stage of a disease, where even Ayurveda cannot help to completely eradicate the problem. The other constraint is the intake of these herbs. They can be in liquid form (*asavam* or *arishta*), jam form (*lehyam*), or powder form (*kwath*), and all of these have a strong or bitter taste. To see a substantial result, one needs to continue the protocol for a minimum of three months and follow a proper diet according to their dosha. Instead of looking for immediate cure, people should be aware that the majority of the problems have been chronic for many years, so it would take a few months to show positive results. Proper food and lifestyle according to body type is a big contributor to the success of Ayurvedic disease management. Taking the Ayurvedic medicines without proper diet and lifestyle can be counter-indicative as incorrect diet and lifestyle could trigger the exact opposite change in the doshas, which the Ayurvedic medicines are trying to control. Dropout rate is between 10%-24%; the reasons are varied with a few due to loss to follow-up, few have second thoughts on the efficacy and few are due to side effect of the cleansing effect that sometimes may occur, which is usually an increase in bowel movements as it clears the digestive system by removing toxins (*ama*).^{68,69}

Drawbacks of Ayurveda

It is acknowledged that Ayurveda as a whole needs to be perfected as there is not enough quality control in terms of the purity, shelf life, and availability of the medicines. Qualified Ayurvedic doctors and practitioners, though present, have not been documented or reviewed so as to differentiate them from fake or inefficient Ayurvedic doctors and practitioners. Compared to mainstream medicine where doctors have been reviewed after going through a rigorous certification process by the federal government to differentiate between a good doctor and an incompetent doctor, there is no database or procedure to find competent Ayurvedic practitioners. Most of all, a lot of clinics have become present across the world, claiming to offer Ayurveda treatment or Panchkarma, where a set of protocols of Ayurvedic oils are used to give massages and medicated therapies which are given according to the disease. The panchkarma not only involves oil massages, but also few days of preparing the individual with medicines leading to intense detoxification involving medicated emesis, purgation and enema depending on the problem and the doshas that have increased for the individual. In contrast to the authentic Ayurvedic

clinics, majority of the so-called Ayurvedic clinics offer only a massage rather than panchkarma treatment. Using the label of Ayurveda, lot of beauty products and supplements have flooded the market. The reliability and efficacy of these products are questionable. AYUSH, an Indian Government undertaking established in 2013, encompassing Ayurveda, Yoga, Unani, Siddh and Homeopathy, has started regulating Ayurvedic companies for quality control and standardization of herbs, improving research and development and the availability of raw materials, and monitoring the education standards of Ayurvedic colleges.⁷⁰

CONCLUSION

With the increasing incidence of chronic disease and cost of healthcare, there is a need for integration of Ayurveda and mainstream medicine. There is a need for an integrative approach to tackle the growing problems in health due to complications such as poor and adulterated food consumption and over-dependence on painkillers. In a few universities in China, for instance China Medical University, the medical students learn both modern as well as traditional medicine, leading to a successful integration of the positive effects of both the systems while realizing the limitations of each.⁷¹⁻⁷³ In India, BHU have an integrated education of modern medicine and Ayurveda.⁷³ Since 2016, India has started offering two-year postgraduate for medical graduates.⁷⁴ The Ayurvedic medical students study both Ayurveda and mainstream medicine in the five and half years of their college education.⁷⁵ There has been some integration of learning of herbs and supplements in a few universities in the USA, but there is a need for a deeper understanding of the Ayurvedic system.⁷⁶ Until there is a complete integration of the two systems where medical students of mainstream medicine and from Ayurveda learn the concepts of the other system, the practitioners from both systems should work together to treat individual cases, using the positive aspects of both. The diagnosis of mainstream medicine with initial medication and procedures from mainstream medicines should be followed by Ayurvedic panchkarma procedures, Ayurvedic medicines, diet and lifestyle. In cases of emergencies, structural problems, and communicable diseases, mainstream medicine should be the first line of treatment. On the other hand, in chronic conditions and for maintaining a healthy body and mind, Ayurveda should be the main system to be considered.

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