

Public Health Approach of Ayurveda and Yoga for COVID-19 Prophylaxis

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Editor's Note: National governments are deeply divided over whether traditional, complementary and integrative practices have value for human beings relative to COVID-19. We witness a double standard. Medical doctors explore off-label uses of pharmaceutical agents that may have some suggestive research while evidence that indicates potential utility of natural products, practices and practitioners is often dismissed. In this Invited Commentary, a long-time *JACM* Editorial Board member Bhushan Patwardhan, PhD, from the AYUSH Center of Excellence, Center for Complementary and Integrative Health at the Savitribai Phule Pune University, India and colleagues from multiple institutions make a case for the potential roles of Ayurvedic medicine and Yoga as supportive measures in self-care and treatment. Patwardhan is a warrior for enhancing scientific standards in traditional medicine in India. Patwardhan was recently appointed by the Ministry of AYUSH, Government of India, as Chairman of an 18 member expert group known as “Interdisciplinary AYUSH Research and Development Taskforce” for initiating, coordinating and monitoring efforts against COVID-19. He was last seen here in an invited commentary entitled “Contesting Predators: Cleaning Up Trash in Science” (*JACM*, October 2019). We are pleased to have this opportunity to share the recommended approaches, the science, and the historic references as part of the global effort to leave no stone unturned in best preparing our populations to withstand COVID-19 and future viral threats. – *John Weeks, Editor-in-Chief, JACM* (johnweeks-integrator.com)

Introduction

THE CORONAVIRUS DISEASE 19 (COVID-19) pandemic is unique and unprecedented in several aspects and has challenged health care systems. At present, the global momentum is unabated, and a second wave is anticipated.¹ The experience and lessons learnt from the earlier severe acute respiratory syndrome (SARS) epidemics appear inadequate and call for better approaches and strategies in public health and medical care. Conventional mainstream medicine is at the forefront when it comes to curbing this menace, especially at the critical care stage. The current prophylactic measures are insufficient, and suggested options such as hydroxychloroquine (HCQ) are still under investigation.^{2,3} The prophylactic and therapeutic potential of traditional and complementary medicine systems such as Ayurveda and Yoga is not really being considered during this crisis and global hunt for effective preventive and treatment measures. In this commentary, we have attempted to highlight the knowledge and practices from Ayurveda and Yoga that might be effectively utilized in the prophylaxis and adjuvant therapy of COVID-19. Several of our recommendations in this paper are driven by the emerging dynamics of the causative organism SARS coronavirus 2 (SARS-CoV-2) and the unravelling of the pathophysiology of COVID-19.⁴ While we

focus here on prophylaxis and the protection of vulnerable target organs, Ayurveda and Yoga as an add-on therapy may support patients of COVID-19 by improving the quality of standard care.

Research and therapeutic strategies for COVID-19 have focused on agents to attack the virus or immunize against it. This leaves aside the consideration of the host—one of the most important factors in disease dynamics. Ayurveda pays particular attention to the host and recommends measures for a healthy lifestyle rather than the mere prescription of medicine. *Charaka Samhita*,⁵ the classic of Ayurveda, describes epidemic management and defines immunity as the ability to prevent disease and arrest its progress to maintain homeostasis. The concept of building strength of mind and body to cope with various stressors, including infection, is a cornerstone of Ayurveda practice. Similar to innate and acquired immunity, the Ayurveda concept of immunity (*Bala* or strength) is classified as natural (*Sahaja*), chronobiologic (*Kalaja*), and acquired (*Yuktikrut*). The holistic approach of Ayurveda toward promoting health (*Swasthavritta*) includes personalized interventions based on host and environmental factors. The interventions include therapeutic cleansing procedures (known as *Panchakarma*)⁶ and certain immunomodulators⁷ (known as *Rasayana*). Local⁸ and systemic⁹ interventions to boost the immune system

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have been advocated to manage respiratory illnesses. The choice of specific Ayurveda therapeutic agents and practices is based on certain individual genetic characteristics known as Dosha *Prakriti* types (*Vata*, *Pitta*, and *Kapha*).¹⁰ In our opinion, several general measures described below may be useful to reduce the risk of SARS-COV-2 infection and complement therapeutic management as add-on treatment.

Local Prophylaxis

The eyes, nose, and mouth are the main portals of entry of droplets carrying the SARS-COV-2. Prior to the final assault in the lungs, the virus gains access to the throat region and stays for some hours. The fatty acid coat of the virus adheres to the moist mucosal layers, which helps it gain entry into the cells by binding to specific cell receptors. Ayurveda classics mention several interventions that are likely to target these entry portals.¹¹ This may help to improve the innate immunologic response of the mucus membranes and may thus inhibit the virus transmission to the lungs. These measures may hence function as “physiological masks” barricading the viral invasion. The general measures for respiratory illnesses described in Ayurvedic texts¹² such as consumption of hot water, hot food, and herbal decoctions, gargling with medicated water, steam inhalation, and local applications may be helpful for symptomatic relief in mild cases.

Medicated water

Drinking hot or warm water is a popular home remedy for many ailments. Ayurveda also advocates this as a measure for improving digestion of *Ama*, a proinflammatory product of impaired metabolic disorders. The presence of *Ama* is linked to increased susceptibility to infections.¹³ Traditionally, warm water is consumed in many parts of India for diverse disorders of fever, inflammation, metabolism, and allergy such as rhinitis and asthma. Several spices that are popularly used in the kitchen are added as single or multiple agents to the boiling water and consumed as medication throughout the day. These spices include dry ginger (*Zingiber officinale*), yashtimadhu (*Glycyrrhiza glabra*), and nut-grass (*Cyperus rotundus*) rhizomes; khus (*Vetiveria zizanioides*) and Indian sarsaparilla (*Hemidesmus indicus*) roots; coriander (*Coriandrum sativum*) and fennel (*Cuminum cyminum*) seeds; and cinnamon (*Cinnamomum verum*) and catechu (*Acacia catechu*) barks.¹⁴

Mouth rinse and gargle

Warm liquids and oils are used as gargles (*gandusha*) or mouth rinses (*kavala*) to cleanse the mouth and throat thoroughly. This can also have a systemic effect.¹⁵ The oils or oily decoctions clean the oral cavity, pharynx, and tonsillar area and are likely to coat the mucosa as biofilm and induce additional immunomodulatory, antioxidant, and antimicrobial benefits.¹⁶ The paramount role of host mucosal immunity in controlling infectious agents is well known.¹⁷ Turmeric (*Curcuma longa*) rhizome, yashtimadhu or liquorice (*Glycyrrhiza glabra*) stem, neem (*Azadiracta indica*) and catechu (*Acacia arabica*) barks, and natural salt may be used to prepare medicated water/solutions for gargles/mouth rinse. Gargles with these medicated decoctions have dem-

onstrated beneficial effects in xerostomia (dry mouth), post-operative sore throat, oral ulcers, gingivitis, and bacterial growth.^{18,19} Glycyrrhizin, an active component in liquorice was found to be more effective than common antivirals in inhibiting the replication of SARS virus and inhibited its adsorption and penetration.²⁰ Yoga texts recommend cleansing of the nasal passage with salt water (*Jala neti*).²¹ The efficacy of salt water in upper respiratory infections has been reported in randomized controlled trials (RCTs), although more conclusive evidence is needed.²²

Nasal oil application

Ayurveda recommends the application of medicated oils made from butter oil (*Ghee*) and vegetable oils such as sesame or coconut in the nostrils. This may protect the respiratory tract from pathogen entry. This procedure known as *nasya* is well described in Ayurveda.⁶ Application of pure sesame oil was found to be effective for the treatment of dry nasal mucosa.²³ Similar to gargles and mouth rinses, nasal oil application possibly forms a biofilm and can help as a barrier to the entry of the virus particles. Researchers of Traditional Chinese Medicine have already proposed the use of nasal oil application for preventing SARS-COV-2 infection.²⁴

Steam inhalation

Steam inhalation and hot fomentation (with aromatic oils such as menthol) provide satisfactory clinical relief in nasal and throat congestion, bronchoconstriction, headache, and sinusitis. Its role in improving nasal conditioning, improving nasal mucus velocity, and reducing congestion and inflammation has been reported in several clinical studies.^{25–27}

Systemic prophylaxis

Ayurveda advocates several non-pharmacological measures that are critical to overall health, including diet, sleep, mental relaxation, lifestyle behavior, and Yoga. Several studies have endorsed the role of Yoga breathing techniques (*pranayama*), postures (*asanas*), and procedures (*yogic kriya*) in improving lung health and exercise tolerance.^{28,29} The recommended daily diet³⁰ includes fresh hot soups of vegetables (radish, trigonella leaves, drum stick vegetable pods) and pulses (lentils, green gram/mung beans, chickpeas) seasoned with spices such as ginger (*Zingiber officinale*), garlic (*Allium sativum*), cumin seeds (*Cuminum cyminum*), and mustard (*Brassica nigra*) seeds (black whole mustard).

Rasayanas as immunomodulators

Rasayana, a specialty of Ayurveda, deals with measures for rejuvenation. Rasayana therapy comprises lifestyle, diet, and medicine that have properties to enhance growth, retard aging, induce tissue regeneration, and stimulate immunity. Due to its effects on improving immunity, Rasayana therapy may have direct relevance to the prophylaxis and management of SARS-COV-2 infection. The botanicals used in Rasayana therapy have been found to be effective in immunomodulation and restoration of immune haemostasis.³¹ Shi et al.³² described the immune response to SARS-COV-2 infection in two phases. The first protective phase of adaptive immune response in the host that may eliminate the

virus in a large proportion of subjects. In relatively few cases, the viral infection progresses, causing intense release of pro-inflammatory cytokines (cytokine storm). The cytokine storm results in severe inflammation, leading to lung damage and co-attendant multi-organ failure. Thus, although antivirals are important, a robust and well-contained immune response to maintain immune homeostasis will be critical for good recovery and reduced mortality. This requires a favorable Th1/Th2 cytokine balance.

Several Rasayana botanicals described in Ayurveda are used in clinical practice for strengthening immunity. Based on our research data, we find *Withania somnifera* (*Ashwagandha*), *Tinospora cordifolia* (*Guduchi*), *Asparagus racemosus* (*Shatavari*), *Phyllanthus embelica* (*Amalaki*), and *Glyceriza glabra* (*Yasthimadhu*) are potential immunomodulators.⁷ Such Rasayana botanicals may be considered for COVID-19 prophylaxis and as an add-on treatment.

Here, we present a few details on *Ashwagandha* as an example. We have carried out several *in vitro*, animal, and clinical studies over the last two decades to demonstrate primarily the immunomodulatory and antioxidant effects of *Ashwagandha*.³³ We have largely focused on its clinical benefit in inflammation, arthritis, and cancer, but it has been used in several other disorders.³⁴ The selective Th1 up-regulation by aqueous extract of *Ashwagandha* roots has been shown in a mice model.³⁵ *Ashwagandha* aqueous extract has a broad-spectrum dose-dependent role in immune homeostasis.³⁶

Based on available data, we suggest that when used appropriately, *Ashwagandha* may be effective in improving host immunity through the modulation of key targets relevant to COVID-19. We have demonstrated the clinical effects of *Ashwagandha* containing Ayurvedic formulation to be equivalent to HCQ in a RCT for treating rheumatoid arthritis.³⁷ Fig. 1

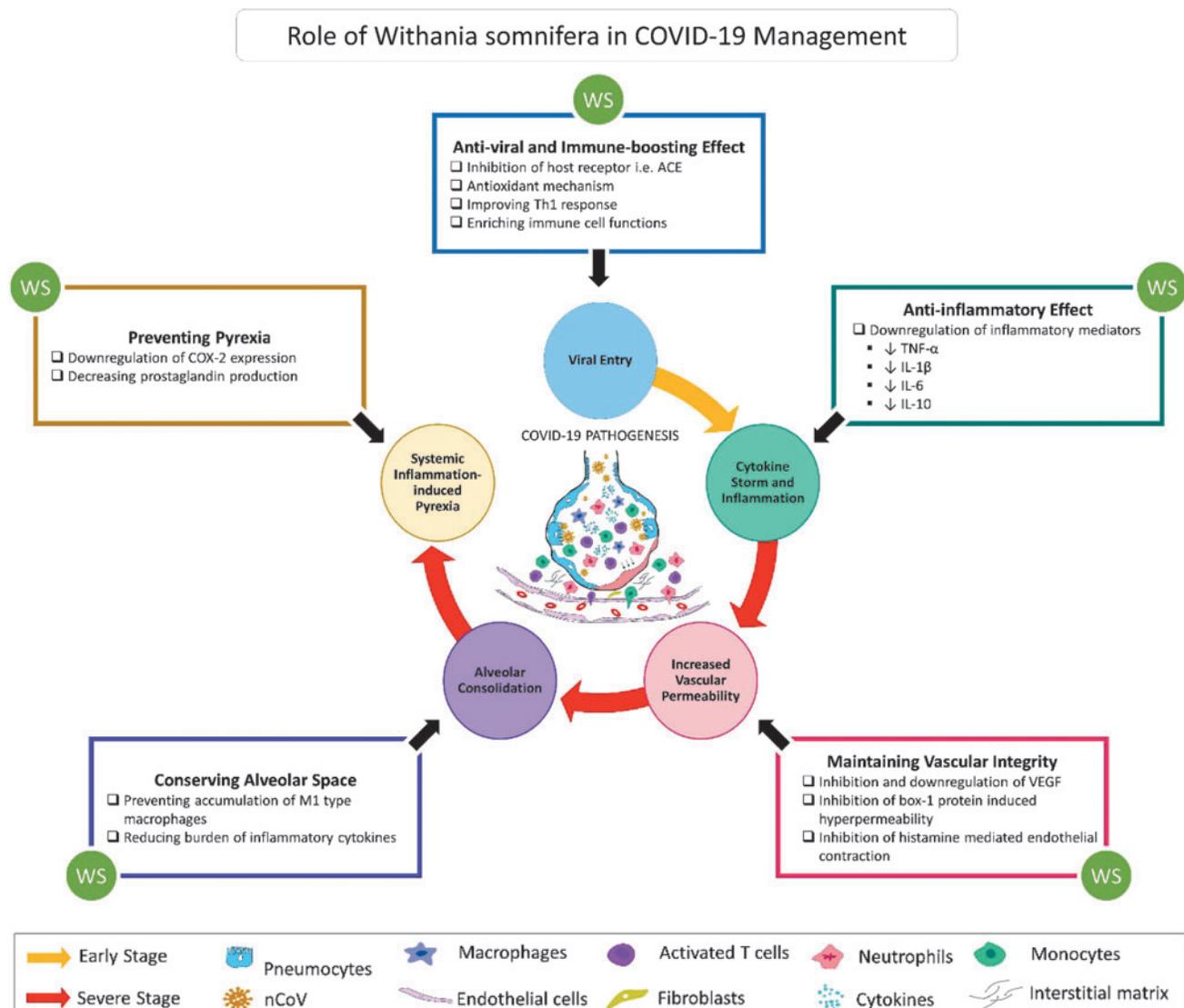


FIG. 1. Potential mechanisms of action of *Withania somnifera* in prophylaxis (antiviral, immune boosting, vascular integrity) and management (pyrexia, anti-inflammatory, conserving alveoli) related clinical targets of COVID-19. ACE, angiotensin-converting enzyme; COX 2, cyclooxygenase 2; IL, interleukin; TH1, T helper type 1; TNF α , tumor necrosis factor α ; VEGF, vascular endothelial growth factor; WS, *Withania somnifera*.

depicts potential mechanisms of action of *Ashwagandha* in prophylaxis (antiviral, immune boosting, vascular integrity) and management (pyrexia, anti-inflammatory, conserving alveoli) related clinical targets of COVID-19.

We therefore suggest that selected *Ashwagandha* formulations may be effective as a prophylactic and adjunct treatment of COVID-19. In our opinion, *Ashwagandha* might be a better and safer alternative to disease-modifying drugs such as HCQ. We recommend further research to determine the clinical efficacy of Rasayana drugs such as *Ashwagandha*, *Guduchi*, *Amalaki*, and *Yashtimadhu*.

Yoga for Mental Health

Poor mental health conditions, including stress and depression, are known to increase the risk of acute respiratory infections.³⁸ Rising numbers of COVID-19 cases and deaths possibly raise stress and anxiety, while loneliness and depressive feelings are likely due to mandatory social distancing measures. Consideration of the mind is another distinction of Ayurveda and Yoga. Several measures for mental health are described, including *pranayama* and meditation. *Pranayama* is known to improve lung function.³⁹ Meditation is found to reduce inflammation markers and influence markers of virus-specific immune response.⁴⁰ Yoga including meditation could be a simple and useful home-based practice for the prevention and post-recovery management of COVID-19.

Discussion

Modern medical care and health systems are being tested to the hilt for effective management of COVID-19. However, there are several gaps. We must remember the basic principle in medicine that “prevention is better than cure.” The simple and feasible measures based on Ayurveda and Yoga could be quickly advertised in public-health campaigns through electronic and print media and information brochures for public distribution and display at prominent locations. The Ministry of AYUSH, Government of India, has already issued a very useful advisory in this context.⁴¹ People are overstressed by the compulsions of social distancing and physical barrier methods. They are likely to find comfort and support in some of the deeply rooted traditional practices that may protect them from the infection and its associated debilitating conditions. Noticeably, these interventions have the advantages of simplicity, affordability, and acceptability and appear promising as feasible measures for large-scale implementation. Ayurveda, Yoga, and meditation have a potential role to engage the community in creating a more positive health environment. Admittedly, there is need for more research. It was welcome news to learn that the United States National Institutes of Health, National Center for Complementary and Integrative Health has engaged a stress-related initiative and is reportedly considering others.⁴² Another timely initiative is the launch of the traditional, complementary, and integrative health and medicine COVID-19 support registry to document practices and products.⁴³ The evidence presented here should draw the attention of stakeholders, including the World Health Organization, to the unexplored potential of traditional medicine systems and adopting integrative approaches in the search for solutions for the COVID 19 crisis. It is high time to embrace integration with an open mind.

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