



Review Article

Relevance of ayurveda in coronavirus disease-2019

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Received : 26 May 2021

Accepted : 24 June 2021

Published : 18 February 2022

DOI

10.25259/MEDINDIA_3_2021

Quick Response Code:



ABSTRACT

India is the land living of culture, religious beliefs, and traditional knowledge. The great sages of India chanted mantras to get revive from all sorts of problems and its echoes have helped the ailing societies through centuries. A very popular mantra, from *Brihadaranyaka Upanishad* (1.4.14), conveys that “May all human beings be at peace, may no one suffer from illness/disease, May all see what is auspicious, may no one suffer.” The expedition for happiness and success has been the dynamic factor in the course of our evolutionary history. Health is wealth but it matters only once someone gets sick; it is the reality in current situation when entire humanity along with its complete health-care system combatting with an unprecedented challenge by the name of pandemic coronavirus disease-2019 (COVID-19). All the treatment modalities in the medical system approach are being implemented to fight with this deadly viral disease. There are many references available in the ancient *Ayurvedic Samhitas*/classics text books about “*Janapadodhwans*” or epidemics along with its causes, pathogenesis, and management. The practical knowledge and the knowledge about the stage of the disease are essential to bridge the Ayurvedic principles with the preventive and curative aspects of the disease. The efficiency of Ayurvedic drugs is known by its age long practice. However, new drugs can be formulated with a combination of drugs. The search for new drugs and new preventive practices in an integrated approach is what the approach needed to tackle the novel virus. In this regard, a literary work effort has made to find how Ayurveda can help to face growing challenge of COVID-19 with respect to various stages of disease in Ayurvedic perspective.

Keywords: coronavirus disease-2019, Pandemic, *Ayurveda*, AYUSH, Yoga and Naturopathy, *Janpadodhwansa*, Infectious disease

INTRODUCTION

Coronavirus disease-2019 (COVID-19) is an on-going global pandemic of COVID-19, caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). The virus was first identified as an outbreak of pneumonia in December 2019 in Wuhan, China, has now been determined to be caused by a novel coronavirus. It is named as SARS-CoV-2.^[1,2] The World Health Organization declared a Public Health Emergency of International Concern regarding COVID-19 on January 30, 2020, and later declared a pandemic on March 11, 2020.^[3] The disease has since spread to 220 countries and regions.^[4] In spite of all efforts to contain it, the pandemic is continuing to spread for the past 2 years. It is the high time that scientific community comes together with their knowledge of the medical systems. Till date, there is no evidence-based treatment for COVID-19 as yet, clinical interventions are being done worldwide. Similar strategy is required to be implemented by Ayurvedic system of medicine. Ayurveda is the most primitive medical science which deals with two major aspects of life, first to protect the health of healthy individual and treatment of diseased person.^[5,6] Ayurvedic interventions are more

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relevant by the fact that there are many references available in the ancient *Ayurvedic Samhitas* and textbooks about epidemics with the name “*Janapadodhwansa*,” along with its causes, pathogenesis, and management.^[7]

LINKING PANDEMIC WITH JANAPADODHWANSA: CONCURRENT EVIDENCES

Pandemics are large-scale outbreaks of infectious disease that can greatly increase morbidity and mortality over a wide geographic area and cause significant economic, social, and political disruption. Evidence suggests that the likelihood of pandemics has increased over the past century because of increased global travel and integration, urbanization, changes in land use, and greater exploitation of the natural environment.^[8,9] A description available in *Charak Samhita; Vimansthana* 3rd chapter, “*Janapadodhwans*” means destruction of a population in a particular area.^[10] It is very much similar with pandemic of modern terminology. There are four factors that have been described which are common and essential for every living being, that is, *Vayu* (air), *Jala* (water), *Desha* (land), and *Kaala* (season).^[11] They are nothing but modes by which infectious diseases spread. Any abnormal alteration in these four factors can significantly influence an individual or community or environment or all of them together. Vitiating of these factors is the cause for *Janpadodhwansa*. Nowadays, we are living for our own instead of caring for others, our faulty lifestyle, increased selfishness, and reduced importance of morality (*Dharma*) all over the world. *Dharma* does not mean religion but it is doing the right things, disciplines, rules, and commitments, which we are supposed to follow, while living in a civil society. When we do not follow this, it is “*Adharma*.” Foremost reason for *Janpadodhwansa* has been described as *Adharma* (immorality) and the root cause of *Adharma* is said to be *Prajnaparadha* (delinquency of wisdom). Not following *Dinacharya* (daily regimen), *Ritucharya* (seasonal regimen), *Vegavidharan* (suppression of urges), and *paapkarma* (sins) are included in *Adharma*.^[12]

CURRENT STATUS OF COVID-19

The COVID-19 pandemic has now risen to a health crisis across the globe. The WHO dashboard shows the current status of the disease on May 26, 2021, there have been 167,423,479 confirmed cases of COVID-19, including 3,480,480 deaths, reported globally. This deadly virus outbreak has challenged India's economic, medical, and public health infrastructure and as on May 26, 2021, there have been 27,157,795 confirmed cases of COVID-19, including 311,388 deaths, reported in India.^[13]

PATHOGENESIS/CLINICAL FEATURES AND PRECIPITATING FACTORS OF COVID-19

Coronavirus was initially identified in the mid-1960s. It mainly caused mild respiratory illnesses in human beings, for instance common cold. However, the outbreak of SARS in 2002 and MERS in 2012 revealed the devastating side of the virus.^[14] In December 2019, the emergence of the novel coronavirus (SARS-CoV-2) that caused COVID-19 brought attention again. Human SARS-CoV identified previously was associated with severe illness in young, elderly, and immune compromised individuals, which led to the exacerbation of pre-existing conditions, such as asthma and chronic obstructive pulmonary disorder (COPD), resulting in hospitalization.^[15] However, SARS-CoV-2 surprised the world with its high transmissibility when compared to SARS-CoV.^[16] First wave in 2019 of SARS-CoV-2 affects elderly and immunocompromised individuals mainly but the second wave in 2021 also affects the younger generation and children.^[17,18] The scientist predicts that the future third wave all over world would affect mostly children.

Utmost patients with COVID-19 predominantly have a respiratory tract infection associated with SARS-CoV-2 infection. However, in a small proportion of cases, they can progress to a more severe and systemic disease characterized by the acute respiratory distress syndrome (ARDS), sepsis and septic shock, and multiorgan failure, including acute kidney injury and cardiac injury. Theories available regarding pathogenesis of coronavirus suggest that after invading the host, virus attaches to the cell surface of the receptors through S (viral spike) proteins, which are present on the surface of the virus and shorter spike-like proteins, also known as hemagglutinin esterase proteins. After that, it enters the cell and replicates in the cytoplasm. Angiotensin-converting enzyme 2 is the main entry receptor for SARS-CoV-2, which is expressed in the tissues, including respiratory, nasal, intestinal epithelial cells, blood vessels, and kidney.^[19] It has been reported that the main mode of transmission of virus is airborne through aerosols (under 100 µm in diameter) formation.^[20] Their minute size and suspension in the air may ease direct contraction of the virus. Aerosols may be formed during various surgical and dental procedures or may be formed as droplet nuclei while talking, coughing, and sneezing by an infected patient. Furthermore, SARS-CoV-2 spreads through droplets, and reports indicate that the virus particles spread up to a distance of 6 feet.^[21]

The most common symptoms of COVID-19 are fever, dry cough, and tiredness. The less common symptoms include loss of taste or smell, nasal congestion, conjunctivitis (also known as red eyes), sore throat, headache, muscle or joint pain, different types of skin rashes, nausea or vomiting, diarrhea, and chills or dizziness. While severe symptoms

includes shortness of breath, loss of appetite, confusion, persistent pain or pressure in the chest, high temperature (above 38°C), and loss of speech or movement.^[22,23] Some other less common symptoms reported are Irritability, confusion, reduced consciousness (sometimes associated with seizures), anxiety, depression, and sleep disorders. More severe and rare neurological complications such as strokes, brain inflammation, delirium, and nerve damage were also reported in COVID-19 patients.^[23] These clinical features indicate that SARS-CoV-2 patients suffer a prolonged illness, as the virus evades immune surveillance more effectively than SARS-CoV.^[24] It is more common in the elderly, in men, and subjects with any comorbid conditions such as diabetes mellitus, hypertension, cardiovascular disease, chronic respiratory illness, and malignancy.^[25]

Infectious conditions in Ayurveda have been explained under *Sankaramaka Vyadhi* that occurs after “*Janapadodhwansa*.” A large population, regardless of their, *Bala* (strength), *Ahara* (Dietary pattern), *Acharana* (conduct), and *Mana* (mental status), affected by the same disease, at the same time, which may destroy the community, is called as “*janapadodhwansa*” disease.^[26] The term “*Janapadodhwansa*” given by *Atreya*, is made up of two words, that is, “*Janpad*” means large population, or community. “*Viddhawansa*” means to get destroyed.^[27] While describing *Ritucharya* (seasonal conducts) *Acharya Sushruta*, narrated about “*Vyapanna ritu*” (unnatural season), *Ausadhi*, *Ahara*, and *Jala* (unwholesome food, drugs, and water), as a cause of epidemic diseases that leads to “*Marak*” (pandemic).^[28] *Atharvaveda* also explains about the spread of disease from two types of worms, one which we can see with eyes and another we cannot see. Worms are mixed with mountain, forest, food products, animals, and liquids, which ultimately enter in body through food, water, and wound. To treat this with earth, water, fire, and sun, some *Mantras* are explained.^[29]

Out of these common factors pertaining entire community air (*Vayu*), water (*Jala*), land (*Dasha*), and time/seasonal variations (*Kala*) are indispensable in progressive manner and may be responsible for spread of infectious disease (COVID-19).^[30] *Sushruta* described certain avoidable factors responsible for *Aupasargik Vyadhi* (communicable diseases) such as *Adharma* (Violation of stipulated behavior), *Pragyaparadha* (Wrong behavior), *Shastraprabhava* (Wars, weapons), *Bhutasanghata* (pathogens, uncleanliness), *Prasangata* (Sexual contact), *Gatrasansparsha* (Physical contact), *Nihawasha* (spreading of aerosol/droplet through breathing), *sahabhajana* (sharing meal), *Sahasaiyashayana* (sharing bed), and *Vastramalyanulepanat* (sharing clothes, ornament, oils/perfumes, and other personal belongings) with affected person.^[31]

Since the disease produces high-grade fever along with dryness (dry cough) and shortness of breath, it can be

considered that vitiation of *Pitta* and *Vata dosha* is present. Fever in Ayurveda is described as *Jwara* and elaborately discussed in chapter *Charaka Samhita*.^[32] It is an independent disease as well as it may be an important symptom in other pathological condition or may be a complication of a disease. Almost all humans experience *jwara* in their lifetime. It affects both *Shareera* (body) and *Manasa* (mind). The description of *Aagantuja-Abhisangaja Jwara* as quoted in *Charaka Samhita* can be linked with mild-to-moderate stage of COVID-19 diseases.^[33] In progression of the disease, the *Bhutabhishanga* (viral infection of the body) vitiates the *Tridosha* and causes *Pranavaha Srotodushti* (pathogenicity) and different forms of *Jwara* (endogenous diseases). The *Hridaya* (heart), *Mahasrotasa* (alimentary canal), and *Rasavahi Dhamani* are *Mulasthanas* (root or origination) of *Pranavaha Srotasa*.^[34] This region is the seat of *Prana* and *Udana Vayu* (related to respiration), *Sadhaka Pitta* (facilitating cell biological functions), and *Avalambaka Kapha* (protection and maintenance of organs). The range of clinical features and involvement of multisystem in progressive stage suggests that the degree of vitiation of *Tridosha* is variable due to magnitude of infection or individual *Sharira Bala* (immunity) of patients.^[35]

DIAGNOSIS OF COVID-19

The diagnosis of COVID-19 is based on careful history taking, physical examination (use of stethoscope is usually avoided due to risk of viral contamination). The nutritional status, immune system, and comorbid conditions play a very key role in prognosis of COVID-19. Ayurveda believes that *Rog pariksha* and *Rogi pariksha* together would complete the protocol of a comprehensive clinical examination. Ayurveda incorporates both clinical and biochemical tools regarding diagnosis of diseases. *Acharya Charaka* and *Vagbhatta* give a three-step diagnosis *Trividha Pariksha*, that is, *Darshana* (Observation) *Sparshana* (Palpation and Auscultation) followed by *Prashna Pariksha* (Leading questions).^[36,37] Furthermore, *Sushruta* elaborated it to *Sadvidha pariksha* and *Yogaratanakarakara* gives a comprehensive eight folds tool for diagnosis, that is, *Astavidha Pariksha*.^[38] It focuses primarily over *Nadi Pariksha*^[39] (Pulse examination). *Acharya Charaka* has suggested a ten step assessment scale called as *Dashvidha Pariksha* to assess the physical strength, immune status, endurance, compactness, and stamina of individuals.^[40] It can be very helpful and decisive for prognosis in general patients as well as with comorbid conditions.

Nowadays, pulse oximetry (an advanced tool for pulse examination) may reveal low oxygen saturation ($SpO_2 < 90\%$). A 6 min walk test is also very useful in early detection of low SpO_2 conditions. Patients with COVID-19 can develop “silent hypoxia” their oxygen saturations

can drop to low levels and precipitate acute respiratory failure without the presence of obvious symptoms of respiratory distress.^[41] Specific tests such as RAT and reverse transcription polymerase chain reaction (RT-PCR), serological and radioimaging investigations are the diagnostic tools. Rapid antigen test for COVID-19 detects certain proteins in the virus, done using a nasal swab to get a fluid sample. The antigen tests can produce results within 10–15 min. RT-PCR-based SARS-CoV-2 RNA detection from respiratory samples is the standard for diagnosis of COVID-19 through throat and nasal swab. However, because of false-negative test result, rates of SARS-CoV-2 PCR testing of nasal swabs, clinical, laboratory, and imaging findings may also be used to make a presumptive diagnosis. Laboratory investigations required in all patients with severe illness include CBC, ABG, comprehensive metabolic panel, blood glucose level, coagulation screen, inflammatory markers (e.g. serum C-reactive protein, erythrocyte sedimentation rate, interleukin-6, lactate dehydrogenase, procalcitonin, amyloid A, and ferritin), cardiac biomarkers, serum creatine, kinase, and myoglobin. The most common laboratory abnormalities are lymphopenia, leukocytosis, leukopenia, thrombocytopenia, hypoalbuminemia, elevated cardiac biomarkers, elevated inflammatory markers, elevated D-dimer, and abnormal liver and renal function.^[42-45] The radiological imagination should be used only when the patient is in a critical condition or PCR tests are unavailable then the role of both X-ray and computed tomography imaging studies comes into play to establishing how to manage the patient, the assessment of complications, and differential diagnosis.^[46]

MANAGEMENT OF COVID-19 DISEASE

(Government of India Clinical Guidance for Management of Adult COVID-19 Patients)

Knowledge on the COVID-19 disease caused by the SARS-CoV-2 coronavirus, as well as on the management of infected patients, remains new issues for the medical fraternity. A myriad of strategies and protocols applied so far to fight the rapid virus spread and to treat the infection worldwide. The MOHFW, Government of India, introduced encouraged and rigorously enforced the practice of isolation, contact tracing, social distancing, wearing of mask, and had implemented a complete nationwide lockdown to prevent the spread of the virus during the first wave.^[47] The MOHFW and Government of India has started the Vaccination on January 16, 2021, and around 197,968,371 people are vaccinated as on May 25, 2021.^[48] A new protocol has been given and modified several times for the management of second wave of the virus. The protocol mentions the directions for investigational therapies such as the use of remdesivir, tocilizumab, convalescent plasma therapy, and

prophylactic dose of low-molecular-weight heparin such as enoxaparin. Dexamethasone, a corticosteroid, has also been included in the treatment protocols for COVID-19 patients in moderate-to-severe stages of illness among other therapeutic measures. Now with the increased risks of post-COVID complications as precipitating diabetes, cardiac problems, kidney disease,^[49] and various skin and fungal infections such as black fungus (mucormycosis) and white fungus, azithromycin in combination with hydroxychloroquine (HCQ) and the plasma therapy use so far to treat patients with severe coronavirus infections has been rolled back from the latest guidelines of ICMR.^[50] The latest guidelines of MOHFW, Government of India, for the management of COVID patients have been categorizing protocol in to three categories in accordance with severity of the disease.^[51]

Mild disease

(Upper respiratory tract symptoms (and/or fever) without shortness of breath or hypoxia) such patients should be advised for home isolation and care about physical distancing, indoor mask use, strict hand hygiene. Symptomatic management (hydration, antipyretics, antitussive, and multivitamins). Stay in contact with treating physician. Monitoring of temperature and oxygen saturation (by applying a SpO₂ probe to fingers) is very important. Immediate medical attention is required if difficulty in breathing or high-grade fever/severe cough, particularly if lasting for >5 days. A low threshold to be kept for those with any of the comorbid conditions. The MOHFW also recommends therapies based on low certainty of evidence for mild cases like, use of Tab. ivermectin with advice to avoid in pregnant and lactating women. Tab. HCQ unless contraindicated. Inhalational budesonide (given through metered dose inhaler/dry powder inhaler) for 5 days) to be given if symptoms (fever and/or cough) are persistent beyond 5 days of disease onset.

Moderate disease

(Respiratory rate >24/min, breathlessness or SpO₂: 90% to < 93% on room air) such cases needs hospitalization in ward with oxygen support (Target SpO₂: 92–96% (88–92% in patients with COPD). Preferred devices for oxygenation are non-rebreathing face mask. Awake proning should be encouraged in all patients requiring supplemental oxygen therapy (sequential position changes every 2 h). Anti-inflammatory or immunomodulatory therapy should be given if needed with Inj. methylprednisolone or dexamethasone, usually for duration of 5–10 days. Patients may be initiated or switched to oral route if stable and/or improving. Anticoagulation therapy is used if needed as conventional dose prophylactic unfractionated heparin or low-molecular-

weight heparin. There should be no contraindication or high risk of bleeding. Clinical monitoring for work of breathing, hemodynamic instability, change in oxygen requirement and serial CXR; HRCT chest to be done only if there is worsening. Laboratory monitoring for inflammatory markers, CRP, and D-dimer 48 to 72 hourly; CBC, KFT, LFT 24–48 hourly; IL-6 levels to be done if deteriorating (subject to availability).

Severe disease

(Respiratory rate >30/min, breathlessness or SpO₂ <90% on room air) these cases needs immediate respiratory support and should be admitted in ICU. Consider use of NIV (helmet or face mask interface depending on availability) in patients with increasing oxygen requirement, if work of breathing is low. Consider use of HFNC in patients with increasing oxygen requirement. Intubation should be prioritized in patients with high work of breathing/ if NIV is not tolerated. Use conventional ARDS net protocol for ventilatory management. Anti-inflammatory or immunomodulatory therapy should be given if needed usually for a duration of 5–10 days. Anticoagulation therapy should be given with weight-based intermediate dose prophylactic unfractionated heparin or low-molecular-weight heparin only if there is no contraindication or high risk of bleeding. Supportive measures should be taken to maintain euvoemia (if available, use dynamic measures for assessing fluid responsiveness). Monitoring of serial CXR; HRCT chest to be done only if there is worsening. Laboratory monitoring for inflammatory markers, CRP, and D-dimer 48 to 72 hourly; CBC, KFT, LFT daily; IL-6 to be done if deteriorating.

The latest guideline endorses using inj. remdesivir on EUA/ off-label use (based on limited available evidence and only in specific circumstances) and suggests to use this drug only in patients with, moderate-to-severe disease (requiring supplemental oxygen) within 10 days of onset of symptom/s and with no renal or hepatic dysfunction. Tocilizumab (off-label) may be considered only in severe patients (preferably within 24–48 h of onset of severe disease/ICU admission) with no active bacterial/fungal/tubercular infection but must having significantly raised inflammatory markers (CRP and/ or IL-6) and in those who are not improving despite use of steroids.

AYURVEDIC CONTRIBUTION TO THE MANAGEMENT OF COVID-19

The traditional system of medicine, collectively known as Ayurveda, Yoga, and Naturopathy, Unani, Siddha, and Sowa-Rigpa and Homeopathy (AYUSH) has been used for maintenance and promotion of health and to treat a variety of diseases in Indian subcontinent for thousands

of years. Ayurveda has enough potential and possibilities to be employed both for prevention and treatment of COVID-19.^[52]

Ayurveda has given general prophylactic measures, should be adopted for all epidemic diseases. It advocates to leave the infected place (*Sthanparityag*), cleanliness (*Niyam*), quarantine (*Prithakakarana*), and purifying atmosphere by *Dhupana* (fumigation), Mental peace is important in this scenario, as fear induces many diseases for this, chanting mantra-pray God (*Daivavyapashray*) should also be done.^[53-55] One should do *Abhyanga* (body massage) with sesame oil, or medicated oil, take steam bath, steam inhalation, clean body after coming at home. According to Ayurveda nasal passage is the gateway of brain (*Nasa hi Sirsho dwaram*). Nose has openings of sinuses, connected to eye and continues below as the airway with rich supply of blood vessel and lots of cranial nerve ends including the sensory area for smell. Loss of smell is a cardinal symptom in COVID-19 patients. Ayurveda suggests *Nasya Karma* (nasal drops of medicated cow's ghee/sesame oil) to prevent virus entry and to increase strength of nasal mucosa by enhancing respiratory immunity.^[56] Nasal oil application for the prevention of COVID-19 infection has been already proposed by Researchers of Traditional Chinese Medicine.^[57] *Vagbhata* narrates that disinfection can be done with sunrays.^[37] Sun salutations (*Surya namaskara*) of rising sun enriched with Vit. D, Daily exercise (*yoga-asana*, *pranayama-anulom-pratilom*) for at least 30 min promotes physical mental health.^[58]

In India, the published data provide fruitful evidence of antiviral properties in traditional formulations of the AYUSH systems of medicine.^[59,60] Since the beginning of the pandemic, Ministry of AYUSH (MOA), Govt. of India has issued an “Advisory on Coronavirus” to cope up with this outbreak. This advisory broadly comprises preventive and prophylactic management for asymptomatic and mild cases of COVID-19 during home isolation. The advisory endorses AYUSH medicines as add on interventions to the conventional care and also certain food ingredients to naturally boost one's immunity and how to stay healthy. In this context, MOA promoted the use of ready-made formulation like “Ayush Kwath,” which is a simple admixture of four herbal ingredients which are well known for their immunomodulatory and antiviral activities along with several other health benefits.^[61]

It is well established now coronavirus has dire effect, especially in persons with comorbid conditions. It alters immune regulatory mechanism and damage immune homeostasis. The Rasayan dravyas mentioned in Ayurveda are known for their immunomodulatory and rejuvenating effects.^[62] Hence, they may have relevance in prophylaxis

and management of COVID pandemic by boosting immune system. Many *in vitro* and animal trials suggest that Ayurvedic drugs such as Ashwagandha (*Withania somnifera*),^[63] Guduchi (*Tinospora cordifolia*),^[64-66] Haridra (*Curcuma longa*),^[67] and Tulsi (*Ocimum sanctum*)^[68] have multiple therapeutic actions including antimicrobial, antiviral, anti-inflammatory, antioxidants, and immunomodulatory effects. Acharya Charak has described Amalaki (*Phyllanthus embelica*) as Vayaha sthapana naam i.e. the best rejuvenating herb. This is a rich natural source of Vitamin C. It is found to be effective against Virus. Amalaki improves immune response by enhancing IL-2, gamma-IFN, and natural killer cell activity. It is well known for its anti-aging, detoxification, and antioxidant properties.^[69] Hence, it can be a useful prophylaxis against COVID-19. Mulethi (*Glyceriza glabra*) has antiviral activity against HIV, has potent immunomodulatory and antioxidant effect.^[70] The major component glycyrrhizin of this plant is more effective than common antivirals in inhibiting the replication of SARS virus and also inhibits its adsorption and penetration.^[71] As of now, no specific treatment is available in western medicine for corona virus. Hence, prevention seems to be the best strategy. The traditional Indian system of medicine, that is, Ayurveda can prove to be successful for prophylaxis and treatment protocol of COVID-19.^[72]

Keeping note on the public health challenges in second wave of COVID-19, revised guidelines were issued by MOA, Government of India on April 26, 2021. The latest guideline divides patient in to the four target groups (T.G.), that is, T.G.-1: Quarantine and home isolation subjects without corona positive test and health workers, T.G.-2: Subjects with mild, severe symptomatology, comorbid, and immunocompromised conditions, T.G.-3: Vulnerable subjects (Pregnant and Lactating women, Children, Geriatric subjects), and T.G.-4: Post-COVID subjects for restorative health care. All the standing instructions issued by health authorities (MOHFW, WHO, and state/local health authorities) were adhered completely and Ayurveda Management stand as “ADD ON” to the present contemporary line of management.

The protocol deals with the symptomatology of COVID-19 patients in three stages.^[73]

1st stage (COVID-19 positive or negative with mild symptoms)

The presenting feature of COVID-19 includes *Sukapurnagalasyata* (Sore throat), *KantheKandu* (nasal congestion), *Bhojanaavarodha* (difficulty in swallowing/deglutition), *Angamarda* (malaise), *Jwara* (mild fever), *Kasa* (dry cough), *Sirahashoola* (headache), *Aruchi* (Anorexia), and Myalgia in mild state of the disease. Hence, we can

say this stage is with *Vata-Pitta* predominance. A small percentage of cases are asymptomatic and some patients may have uncommon clinical manifestations like *Rasa-Gandha Bodha Nipata* (loss of smell and taste). First-line treatment for uncomplicated cases in this stage recommends the use of *Mahasudarshana GhanVati*, *Samshamni Vati*, and *Sanjeevani Vati** for fever and Malaise like symptoms. The *Kwatha* (decoction) preparations used for similar symptoms, namely, *ChaturthakaJvaraharakwatha/PathyadiKashayam/BharangyadiKashayam/Guduchyadi Kashayam* should be given empty stomach. *Talishadi churna* is given for dry cough while *Sitopaladi churna* is used in productive cough. *Yastimadhu churna* is taken for its expectorant and bronchodilator properties. *Yashtimadhughanvati*, *Lavangadivati*, and *Vyoshadivati** can be added as lozenges to help in sore throat, nasal congestion, and cough. *Ashwagandharishta* or *Balarishta* and *Rasnasaptakakwatha** should be used for Myalgia (*Contraindicated pregnant and lactating women).

2nd stage (COVID-19 positive with specific symptoms at moderate level)

This stage is with *Vata-Kapha* predominance. In this stage, there is involvement of *Pranavaha shrotasa* (L.R.T.I. involving the Lung area). The main symptoms are *Jwara* (high-grade fever) followed by *sushka/ardra Kasa* (dry/productive cough), *Swasa* (dyspnea), *Gauravam* (heaviness in chest and body), *UrahaShoola* (Pain in/around chest area), and *Swarabheda* (hoarseness of voice). In this condition along with contemporary medical treatment, *Trikatu Siddha jala**, *Vyaghri Haritakileha**, *Agastya Rasayana*, and *Kantakari Avaleha** can be given for better result. Patients should be advised *kawal/Gandusha* (gargling with warm water mixed with rock salt and turmeric or with *Yashtimadhu Phanta*) 3–4 times daily get quick relief from congestion in chest. *Amritarishta* is given for the treatment of chronic fever, and to fight infections, as its main contain *Guduchi* is a natural immunity booster and increases non-specific immunity.^[74] *Shwasakuthara Rasa* and *Naradiya Lakshmvilasa Rasa* are given in high-grade fever, cough, and dyspnea along with inflammatory conditions in respiratory tract disorders. *Acharya Charaka* quoted to use *Shadangapaneeya* (medicated lukewarm water) is given in persons with high-grade fever.^[75] Steam inhalation can help to prevent accumulation of cough in upper respiratory tract, if done under medical supervision^[56] (*Contraindicated pregnant and lactating women).

3rd stage (COVID-19 positive with severe symptoms with respiratory distress, etc.)

This stage is with *Vata-Kaphaja Sannipatikajwara* predominance. This is the advanced stage or *upadravavastha*

(complicated stage) of the disease having *Tivrajwara* (hyperpyrexia), *Swasaavarodha* (severe dyspnea), *Urahakshata* (Pneumonia in severe state), *Sosha/Rajyakshma* (P. Koch's), and *Raktasthevana* (hemoptysis). This condition may lead to multiorgan failure followed by fibrosis of lungs and death. In this condition, if the patients are advised for oral intake on their own. There are some Ayurvedic drugs that can be given along with contemporary medical treatment. The first-line drugs in this situation contains *Dhanwantara* (with *Jeeraka* water), *Sameerapannaga Rasa*/Shringarabhra* (with Honey) can help in relieving symptoms such as hyperpyrexia and pleurisy. *Marsha Nasya** (*Shirovirechana*) can be given with *AnuTaila/Shadbindu Taila/Sarshapa Taila* along with steam inhalation with *Ajwain/Pudina/Eucalyptus* oil it helps to prevent virus entry and increase strength of nasal mucosa increase strength of nasal mucosa. The second-line drugs *Somasava**, *Dashmularishta**, and *Dashamoolakwatha** with *Pippali choorna prakshepa* should be given empty stomach (*Contraindicated pregnant and lactating women).

POST-COVID-19 MANAGEMENT PROTOCOL

However, the mortality rates for COVID-19 cases in India remain less than 2%, long-term complications among survivors of the infection having clinically significant. The post-infection complications are rising and this is the major concern for upcoming years. Most of the patients are managing well in isolation during the first 10 days, but many are also developing breathing difficulties after turning COVID-19 negative. Only follow-up studies will clarify the extent of the sequel on organ functions, such as respiratory, renal, cardiovascular, as well as psychological or psychiatric disorders and related chronic pain. Pranayama is known to improve respiratory functions. Meditation reduces stress. Several studies have endorsed the role of breathing techniques (pranayama), postures (asanas), and procedures (yogic kriya) in improving lung health and exercise tolerance.^[76] MOHFW, Government of India, has published the post-COVID-19 management protocol which includes drinking of adequate amount of warm water, immunity promoting AYUSH medicines, personal hygiene, practice of *Yogasana*, *Pranayama* and meditation, balanced nutritious diet, avoid smoking and consumption of alcohol, and self-health monitoring at home. Moreover, the protocol also emphasized that the recovered individuals should be encouraged to share their positive experiences with their friends and relatives for creating awareness. The post-COVID-19 management protocol, 2020 suggests that first follow-up visit (physical/ telephonic) should be within 7 days after discharge, preferably at the hospital where he/she underwent treatment. Subsequent treatment/follow-up visits may be

with the nearest qualified allopathic/AYUSH practitioner/ medical facility of these systems of medicine.

CONCLUSION

Charaka, *Sushruta*, *Vagbhatta*, and coworkers in Ayurveda, well-explains about Epidemic/pandemic diseases. Causes of epidemic disease and treatment of it were done since "Vedic age." "Prevention is better than cure" and it leftovers the only way for handling pandemics like COVID-19 that comes to destroy humanity once in a decade. Ayurveda not only aims to heal the diseased but also to protect the health of the healthy individuals. Intake of ginger, garlic, cumin, coriander, cinnamon, clove, and turmeric in diet not only helps in preventing entry of virus in individuals by increasing "Vyahikshamatva" (Immunity) but also plays a key role in restoration of health in infected persons. Early detection and separation (distancing one from the affected individuals) along with upholding oxygen saturation to optimal level is the key. The need of the hour is to understand, establish, and publicize the knowledge in masses. Prophylactic use of the evidence-based Ayurvedic formulations such as *AYUSH-64*, *Samshamni Vati*, *Vasavleha*, *Agastyaharitaki avaleha*, and *Ashwagandha* tablets is very effective for the management of asymptomatic and mild cases of COVID-19. Several measures such as *Nasya* (medicated steam inhalation) *Abhyang*, *Dinacharya*, *Ritucharya*, *Sadvritta* (Lifestyle), *Ahara* (diet), *Vyayama* (exercise), *Yoga*, and *Pranayama* can play a key role in maintaining health and preventing diseases. At present, numerous prophylactic, observational, and interventional clinical trials are in progress at a good pace to evaluate the safe and effective use of AYUSH medicines in persons with COVID-19 infection. The largest vaccination drive in India is continuing with vaccines such as CoviShield, Sputnik-V, and the first indigenous COVID-19 vaccine named Covaxin. Further, more data continue to emerge, from on-going clinical trials of vaccines for COVID-19 and AYUSH medicines, through controlled clinical trials which might be potent to treat novel coronavirus.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Zhou P, Yang XL, Wang XG, Hu B, Zhang L, Zhang W, *et al.* A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature* 2020;579:270.e3.
- Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, *et al.* Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. *Lancet* 2020;395:507.e13.
- An Interactive Web-based Dashboard to Track Coronavirus Disease. Available from: <https://www.who.int/covid-19>. [Last accessed on 2021 May 25].
- Available from: <https://www.worldometers.info/coronavirus/countries-where-coronavirus-has-spread>. [Last accessed on 2021 May 26].
- Agnivesha A, Samhita C, Deepika T. *Ayurvedacharya Shri Jayadev Vidyalankar, Part-1, Sutrasthana 30/24. 4th ed. Banaras: Motilal Banarasidas; 1948.*
- Samhita SS. *Acharya Atridev and Shri Bhaskar Govindji Ghanekar, Sutrasthan 1/1. 4th ed. New Delhi: Motilal Banarasidas; 1975.*
- Goyal M. Threats and challenges of emerging viral diseases and scope of Ayurveda in its prevention. *Ayu* 2019;40:67.e8.
- Jones KE, Patel NG, Levy MA, Storeygard A, Balk D, Gittleman JL, *et al.* Global trends in emerging infectious diseases. *Nature* 2008;451:990-93.
- Morse SS. Factors in emergence of infectious diseases. *Emerg Infect Dis* 1995;1:7-15.
- Agnivesha A, Samsita C, Sthana V, Adhyaya J. Chapter-3 Vrs. 4, English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 140.
- Agnivesha A, Samsita C, Sthana V, Adhyaya J. Chapter 3Vrs. 6, English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 140.
- Agnivesha A, Samsita C, Sthana V, Adhyaya J. Chapter 3Vrs.20, English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 140.
- World Health Organization. WHO coronavirus (Covid-19) dashboard. Geneva: World Health Organization. Available from: <https://www.covid19.who.int>. [Last accessed on 2021 May 26].
- Kaslow RA, Stanberry LR, Le Duc JW, Cowling BJ, Peiris JSM, Monto AS. Viral infections of humans. 2014;2014:199-223.
- Ye ZW, Yuan S, Yuen KS, Fung SY, Chan CP, Jin DY. Zoonotic origins of human coronaviruses. *Int J Biol Sci* 2020;16:168697.
- Zhu Z, Lian X, Su X, Wu W, Marraro GA. From SARS and MERS to COVID-19: a brief summary and comparison of severe acute respiratory infections caused by three highly pathogenic human coronaviruses. *Respir Res* 2002;21:224.
- Worldometer; 2020. Available from: <https://www.worldometers.info/coronavirus/coronavirus-age-sex-demographics>. [Last accessed on 2021 May 26].
- World Health Organization. Coronavirus Disease 2019 (COVID-19) Situation Report. Geneva: World Health Organization; 2020.
- Bourgonje AR, Abdulle AE, Timens W, Jan-Luuk H, Gerjan JN, Sanne JG, *et al.* Angiotensin-converting enzyme 2 (ACE2), SARS-CoV-2 and the pathophysiology of coronavirus disease 2019 (COVID-19). *J Pathol* 2020;251:228-48.
- Tellier R, Li Y, Cowling BJ, Tang JW. Recognition of aerosol transmission of infectious agents: A commentary. *BMC Infect Dis* 2019;19:101.
- Available from: <https://www.cdc.gov/coronavirus/2019ncov/preventgettingsick/prevention.html>. [Last accessed on 2021 May 25].
- da Rosa Mesquita R, Silva LC Jr, Santana FM, de Oliveira TF, Alcántara RC, Arnozo GM, *et al.* Clinical manifestations of COVID-19: In the general population: Systematic review. *Wien Klin Wochenschr* 2021;133:377-82.
- WHO Dashboard: Symptoms of Covid-19; Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-Covid-19>. [Last accessed on 2021 May 25].
- Tay MZ, Poh CM, Rénia L, MacAry PA, Ng LF. The trinity of COVID19: Immunity, inflammation and intervention. *Nat Rev Immunol* 2020;20:36374.
- Rashedi J, Poor BM, Asgharzadeh V, Pourostadi M, Kafil HS, Vegari A, *et al.* Risk factors for COVID-19. *Infez Med* 2020;28:469-74.
- Singh RH. *Swasthavritta Vigyana. 2nd ed., Ch. 16. Chaukhambha Sanskrit Pratishthan: New Delhi; 1997. p. 191-2.*
- Agnivesha A, Samsita C, Sthana V, Adhyaya J. Chapter- 3Vrs. 1, English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 140.
- Sushruta S, Samhita S, Sutrasthana S. *Ritucharya, Chapter-6 Vrs17-19, Hindi Commentary by Dr. Ambika Dutta Shastri. 12th ed. Shastri; 2001.*
- Prasad PV. General Medicine In Atharvaveda W.s.r. to Yaksma (Consumption/Tuberculosis). Available from: <http://www.ccras.nic.in/sites/default/files/viewpdf/jimh/biihm>. [Last accessed on 2021 May 25].
- Agnivesha A, Samsita C, Sthana V, Adhyaya J. Chapter- 3Vrs. 10- 11, English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 145.
- Sushruta S, Samhita S, Kusthanidana N. Chapter-5Vrs 32-33, Hindi Commentary by Dr. Ambika Dutta Shastri. 12th ed. Shastri; 2001.
- Agnivesha A, Samsita C, Sthana N, Nidana J. Chapter-1Vrs.30-32; English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 26-7.
- Agnivesha A, Samsita C, Sthana C, Chikitsa J. Chapter-3Vrs.111,115-116; English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 142.
- Agnivesha A, Samsita C, Sthana V, Vimana S. Chapter-5Vrs.7-8; English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 117.
- Rashmi P, Gurao UR, Namburi S, Kumar S, Khode NV, Mahulkar DM. Pathogenesis of COVID-19: A Review on Integrative Understanding through Ayurveda. *J Res Ayurvedic Sci* 2002;4:1-10.
- Agnivesha A, Samsita C, Sthana V, Adhyaya R. Chapter- 4Vrs. 3, 5; English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 161-2.

37. Vagbhata, V, Vyakhya AS. Kunte AM, editors. Ashtanghrudayam. 1st ed. Varanasi: Chaukhamba Orientalia Publication; 1988. p. 346.
38. Sushruta S, Samhita S, Sutrasthana S, Adhyaya V. Chapter-10 Vrs-04, Hindi Commentary by Dr. Ambika Dutta Shastri. 12th ed. Shastri; 2001.
39. Yogratakara Y, Ardha P, Pariksha AS. Sloka 1-3, Page No. 7; English commentary by Dr. Madhan Shetty Sureshbabu. 2nd ed., Vol. 1. Varanasi: Chaukambha Sanskrit Series Office; 2011.
40. Agnivesha A, Samsita C, Sthana V, Adhyaya R. Chapter- 8Vrs. 94; English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 1260-2.
41. Xie J, Tong Z, Guan X, Du B, Qiu H, Slutsky AS. Critical care crisis and some recommendations during the COVID-19 epidemic in China. *Intensive Care Med* 2020;46:837-40.
42. Goyal P, Choi JJ, Pinheiro LC, Schenck EJ, Chen R, Jabri A, et al. Clinical characteristics of Covid-19 in New York city. *N Engl J Med* 2020;382:2372-4.
43. Li LQ, Huang T, Wang YQ, Wang ZP, Liang Y, Huang TB, et al. COVID-19 patients' clinical characteristics, discharge rate, and fatality rate of meta-analysis. *J Med Virol* 2020;92:577-83.
44. Zhu J, Zhong Z, Ji P, Li H, Li B, Pang J, et al. Clinicopathological characteristics of 8697 patients with COVID-19 in China: A meta-analysis. *Fam Med* 2020;8:e000406.
45. Zhang ZL, Hou YL, Li DT, Li FZ. Laboratory findings of COVID-19: A systematic review and Meta-analysis. *Scand J Clin Lab Invest* 2020;80:441-7.
46. COVID-19:BSTI Statement and Guidelines; 2020. Available from: https://www.bsti.org.uk/media/resources/files/BSTI_COVID19_Radiology_Guidance_version_2_16.03.20.pdf. [Last accessed on 2021 May 24].
47. Jabaris SS, Ananthalakshmi V. The current situation of COVID-19 in India. *Brain Behav Immunity Health* 2021;11:100200.
48. Homepage; Dashboard of MOHF, Government of India. Information on Current Status of Covid-19 Cases and Vaccination. Available from: <https://www.mohfw.gov.in>. [Last accessed on 2021 May 26].
49. Madhu SV. Post COVID-19 diabetes care lessons and challenges. *Int J Diabetes Dev Ctries* 2020;2020:1-3.
50. Black Fungus Complication Adds to India's Covid Woes: All you need to know Available from: <https://www.timesofindia.indiatimes.com/india/black-fungus-complication-adds-to-indias-covid-woes-all-you-need-to-know/articleshow/82789342.cms>. [Last accessed on 2021 May 25].
51. AIIMS/ICMR-COVID-19 National Task Force/Joint Monitoring Group (Dte.GHS) Ministry of Health and Family Welfare, Government of India Clinical Guidance for Management of Adult Covid-19 Patients; 2021.
52. Rastogi S, Pandey DN, Singh RH. COVID-19 Pandemic: A Pragmatic Plan for Ayurveda Intervention. Available from: <https://www.sciencedirect.com/science/journal/09759476>. [Last accessed on 2021 May 25].
53. Agnivesha A, Samsita C, Sthana V, Vimana J. Chapter-3 Vrs.40-48; English Commentary by R.K. Sharma and Bhagwan Dash, 5th ed., Vol. 2. Bhagwan Dash; 1998. p. 158-9.
54. Misra SB, Bhavprakash B, Misra B, Vaisya R. 3rd ed., Vol. 169. Varanasi: Chaukhamba Sanskrit Sansthan; 1998.
55. Sushruta S, Samhita S, Sutrasthana S. Ritucharya. 12th ed. Chapter-6 Vrs20, 22-40, Hindi commentary by Dr. Ambika Dutta Shastri; 2001.
56. Singh M, Jaiswal N, Chauhan A. Heated, humidified air for the common cold. *Cochrane Database Syst Rev* 2017;8:CD001728.
57. Fan W, Zeng J, Xu Y. A Theoretical Discussion of the Possibility and Possible Mechanisms of Using Sesame Oil for Prevention of 2019-nCoV (COVID-19 Coronavirus) from the Perspective of Colloid and Interface Science. *ResearchGate*; 2020.
58. Rigveda Samhita; translated by Ramgovind Trivedi, Namaskara S. Prayer of Sun. 1st Mandala, 9th anuvak 50th Sookta in Rig Veda; Chowkhamba Vidyabhawan Varanasi, 2016.
59. Rudra S, Kalra A, Kumar A, Joe W. Utilization of alternative systems of medicine as health care services in India: Evidence on AYUSH care from NSS 2014. *PLoS One* 2017;12:e0176916.
60. Charan J, Kaur R, Bhardwaj P, Kanchan T, Mitra P, Yadav D, et al. Snapshot of COVID-19 related clinical trials in India. *Indian J Clin Biochem* 2020;10:1.
61. Gautam S, Gautam A, Chhetri S, Bhattaraid U. Immunity against COVID-19: Potential role of Ayush Kwath. *J Ayurveda Integr Med* 2020;2020:1-3.
62. Patwardhan B, Chavan-Gautam P, Tillu GG, Chopra A, Gairola S, et al. Ayurveda rasyana in prophylaxis of COVID-19. *Curr Sci* 2020;118:1158-60.
63. Tiwari R, Chakraborty S, Saminathan M, Dhama K, Singh SV. Ashwagandha (*Withania somnifera*): Role in safeguarding health, immunomodulatory effects, combating infections and therapeutic applications: A review. *J Biol Sci* 2014;14:77-94.
64. Sharma P, Dwivedea BP, Bisht D, Dash AK, Kumar D. The chemical constituents and diverse pharmacological importance of *Tinospora cordifolia*. *Heliyon* 2019;5:e02437.
65. Saha S, Ghosh S. *Tinospora cordifolia*: One plant, many roles. *Anc Sci Life* 2012;31:151-9.
66. Akhtar S, Use of *Tinospora cordifolia* in HIV infection. *Indian J Pharmacol* 2010;42:57.
67. Wen CC, Kuo YH, Jan JT, Liang PH, Wang SY, Liu HG, et al. Specific plant terpenoids and lignoids possess potent antiviral activities against severe acute respiratory syndrome coronavirus. *J Med Chem* 2007;50:4087-95.
68. Jamshidi N, Cohen MM. The clinical efficacy and safety of Tulsi in humans: A systematic review of the literature. *Evid Based Complement Altern Med* 2017;2017:9217567.
69. Saini A, Sharma S, Chibber S. Protective efficacy of *Embelica officinalis* against *Klebsiella pneumoniae* induced pneumonia in mice. *Indian J Med Res* 2008;2:188-93.
70. Akamatsu H, Komura J, Asada Y, Niwa Y. Mechanism of anti inflammatory action of glycyrrhizin: Effect on neutrophil functions including reactive oxygen species generation. *Planta Med* 1991;57:119-21.
71. Cinatl J, Morgenstern B, Bauer G, Chandra P, Rabenau H, Doerr HW. Glycyrrhizin, an active component of liquorice roots, and replication of SARS associated coronavirus. *Lancet* 2003;361:2045-6.
72. Joshi JA, Puthiyedath R. Outcomes of Ayurvedic care in a

- COVID-19 patient with hypoxia: A case report. *J Ayurveda Integr Med* 2020;2020:1-5.
73. National Clinical Management Based on Ayurveda and Yoga for Management of Covid-19. Available from: <https://www.ayush.gov.in/docs/ayush-protocol-covid-19.pdf>. [Last accessed on 2021 May 25].
74. Aranha I, Venkatesh YP. Humoral immune and adjuvant responses of mucosally-administered *Tinospora cordifolia* immunomodulatory protein in BALB/c mice. *J Ayurveda Integr Med* 2020;11:140-6.
75. Agnivesha A, Samsita C, Sthana C, Chikitsa J. Chapter-III Vrs.145; English Commentary by R.K. Sharma and Bhagwan Dash. 5th ed., Vol. 3. Bhagwan Dash; 1998. p. 152.
76. Kaminsky DA, Guntupalli KK, Lippmann J, Burns SM, Brock MA, Skelly J, *et al.* Effect of yoga breathing (Pranayama) on exercise tolerance in patients with chronic obstructive pulmonary disease: A randomized, controlled trial. *J Altern Complement Med* 2017;23:696-704.

How to cite this article: Mishra M. Relevance of ayurveda in coronavirus disease-2019. *Med India* 2022;1:4.