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RESEARCH ARTICLE

ROLE OF AYURVEDIC DRUGS AS IMMUNITY BOOSTERS IN NOVEL CORONA VIRUS: A CONCEPTUAL STUDY

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ABSTRACT

The novel corona virus (SARS-CoV-2) infection, which first appeared in Wuhan, China in December 2019, has now spread to over 222 countries and territories. The ever-growing list of patients with corona virus-19 disease (Covid-19) has demonstrated the high rate of transmission among humans. To avoid or survive a Covid-19 pandemic, one will need a lot of good immunity. *Ayurveda* explains to us how to evolve our physiological responses in order to strengthen our immune system. In *Ayurveda*, the preventive aspects of pandemic situations are defined in sufficient details. They must be researched scientifically and fine-tuned for precision. As prevention is always better than cure, the *Ayurveda* ways can be considered for future strategies to avoid pandemics such as Covid-19. *Ayurveda* has described many herbal and compound drugs for improving the immunity like single herbs *guduchi*, *marich*, *ashwagandha*, *yashthimadhu*, *rasona* and compound medicines like *chyawanprasa*, *chitraka haritaki*, *agastya haritaki rasayana*, *giloy ghanvati*, *kanakasava*, *kantakary avaleha*, *haridra* etc. In this pandemic scenario, this conceptual study shows how immunity can be strengthened as a preventive and curative measure.

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INTRODUCTION

A new virus known as SARS-CoV-2 (severe acute respiratory syndrome corona virus 2) has been reported as the source of a disease outbreak that started in China in 2019. The disease is known as corona virus disease 2019 (Covid-19) and WHO declared it a pandemic in March 2020. The virus spreads by respiratory droplets released when someone infected with the virus coughs, sneezes or talksⁱ. In *Ayurvedic* point of view, covid 19 is a *Janapadodhwamsa vikara* (epidemic disease) mentioned in *charaka samhita*ⁱⁱ. *Janapadodhwamsa* is a situation where the environment - air, water, land and season, all are vitiated, causing a simultaneous manifestation of a disease among large populations (epidemic) and destroying human habitationsⁱⁱⁱ. In response to SARS-CoV2, both innate and adaptive immune systems are involved^{iv}. In *Ayurveda* immunity depends on *ojas*, equilibrium state of *kapha* and *udanavata*. Many *Ayurvedic* single drugs like *guduchi*, *tulsi*, *marich*, *ashwagandha* etc. and compound drugs like

chyawanprash, *laxmivilas ras*, *giloy ghanvati* etc. are there to increase immunity.

Aims and Objective: To evaluate, elaborate and discuss the various *Ayurvedic* single and poly-herbal drugs as immunity enhancers in covid patients as well as healthy individuals.

MATERIALS AND METHODS

Material related to this article is collected from *Ayurvedic* texts and text books of modern medicine respectively. The available commentaries of *ayurvedic samhitas* have also been referred to collect relevant matter.

Pathological findings: Covid-19 pathological findings can be divided into three phases that correspond to different clinical stages of the disease.

Stage 1- Asymptomatic state (initial 1-2 days of infection): The inhaled virus SARS-CoV-2 likely binds to epithelial cells

in the nasal cavity and starts replicating. ACE2 is the main receptor for both SARS-CoV2 and SARS-CoV. At this stage the virus can be detected by nasal swabs. Although the viral burden may be low, these individuals are infectious. The RT-PCR value for the viral RNA might be useful to predict the viral load and the subsequent infectivity and clinical course. Perhaps super spreaders could be detected by these studies^v.

Table no 1. Improve immunity guidelines given by the Ministry of Ayush^{xi}

1.General measures	1. Drink warm water throughout the day 2. Daily practise <i>yogasana</i> , <i>pranayama</i> and meditation for at least 30 minutes. 3. Spices like <i>haldi</i> (turmeric), <i>jeera</i> (cumin), <i>dhaniya</i> (coriander) and <i>lahsun</i> (garlic) are recommended in cooking.
2.Ayurvedic immunity promoting measures	1. Take <i>chyawanprash</i> 10gm (1tsf) in the morning. Diabetics should take sugar free <i>chyawanprash</i> . 2. Drink herbal tea / decoction (<i>kadha</i>) made from <i>tulsi</i> (basil), <i>dalchini</i> (cinnamon), <i>kalimirch</i> (black pepper), <i>shunthi</i> (dry ginger) and <i>munakka</i> (raisin) – once/twice daily. Add <i>jaggery</i> (natural sugar) and / or fresh lemon juice to your taste, if needed. 3. Golden milk: 1/2 tea spoon <i>haldi</i> (turmeric) powder in 150 ml hot milk – once or twice a day.
3.Simple ayurvedic procedures	1. Nasal application - apply sesame oil / coconut oil or <i>ghee</i> in both the nostrils (<i>pratimarsh nasya</i>) in morning and evening. 2. Oil pulling therapy- take 1 table spoon sesame or coconut oil in mouth. Swish in the mouth for 2-3 minutes and spit it off followed by warm water rinse. This can be done once or twice a day.
4. During dry cough or sore throat	1. Steam inhalation with fresh <i>pudina</i> (mint) leaves or <i>ajwain</i> (caraway seeds) can be practiced once in a day. 2. <i>Lavang</i> (clove) powder mixed with natural sugar / honey can be taken 2-3 times a day in case of cough or throat irritation

Stage 2- Upper airway and conducting airway response (next few days): The virus propagates and migrates down the respiratory tract along the conducting airways, and a more robust innate immune response is triggered. Nasal swabs or sputum should yield the virus (SARS-CoV-2) as well as early markers of the innate immune response. At this time, the disease covid-19 is clinically manifested.

The level of CXCL10 (or some other innate response cytokine) may be predictive of the subsequent clinical course^{vi}. Viral infected epithelial cells are a major source of beta and lambda interferons. CXCL10 has been reported to be useful as disease marker in SARS. For about 80% of the infected patients, the disease will be mild and mostly restricted to the upper and conducting airways. These individuals may be monitored at home with conservative symptomatic therapy^{vii}.

Stage 3. Hypoxia, ground glass infiltrates and progression to ARDS: Unfortunately, about 20% of the infected patients progress to stage 3 disease and will develop pulmonary infiltrates and some of these will develop very severe disease. Initial estimates of the fatality rate are around 2%, but this varies markedly with age. The fatality and morbidity rates may be revised once the prevalence of mild and asymptomatic cases is better defined. The end result is likely a self-replicating pulmonary toxin as the released viral particles infect type II cells in adjacent units. The pathological result of SARS and Covid-19 is diffuse alveolar damage with fibrin rich hyaline membranes and a few multinucleated giant cells^{viii}. The aberrant wound healing may lead to more severe scarring and fibrosis than other forms of ARDS.

Table no 2. Some single herbs for improving immunity

Sr.no	Drug name	Botanical name	Uses	Effects on Dosha
1.	<i>Ashwagandha</i> ^{xii}	<i>withania somnifera</i>	The natural compounds from <i>ashwagandha</i> have the potential to be an effective covid preventive drug, according to the research. Reduce blood sugar levels, cortisol levels, depression, inflammation and increase strength, muscle mass and brain function.	balances <i>tridosha</i> especially <i>kapha</i> and <i>vata</i>
2.	<i>Tulsi</i> ^{xiii}	<i>ocimum sanctum</i>	Relieves lung-related diseases like asthma, bronchitis, congestion, cough and also beneficial in cramping, gastric disorders, blood pressure.	balances <i>vata</i> and <i>kapha dosha</i> , increase <i>pitta dosha</i>
3.	<i>Amalaki</i> ^{xiv}	<i>emblica officinalis</i>	main ingredient in <i>chyawanprash</i> , an <i>Ayurvedic</i> concoction to boost immune system and also helpful in detoxifying the entire organ system for better health and immunity.	balances <i>tridosha</i> and especially pacifies <i>pitta dosha</i>
4.	<i>Haridra</i> ^{xv}	<i>curcuma longa</i>	anti-inflammatory and antioxidant properties, improves brain functions and lowers the risk of heart diseases.	balances <i>vata</i> and <i>kapha</i>
5.	<i>Guduchi</i> ^{xvi}	<i>tinospora cordifolia</i>	anti-diabetic, antipyretic, anti-arthritic, antispasmodic, anti-inflammatory, antioxidant, anti-allergic, anti-stress, anti-leprotic, antimalarial, hepatoprotective, immunomodulatory and anti-neoplastic activities.	balances <i>tridosha</i>
6.	<i>Brahmi</i> ^{xvii}	<i>bacopa monnieri</i>	memory enhancer, aphrodisiac and a health tonic	balances <i>kapha</i> and <i>vata</i>
7.	<i>Shunthi</i> ^{xviii}	<i>zingiber officinale</i>	useful in respiratory disorder, relieves thirst, hiccup, cough, asthma etc.	balances <i>kapha</i>
8.	<i>Madhu</i> ^{xix}	Honey	respiratory disorder, natural detox agent, anti-toxic, relieves thirst, hiccup, cough, asthma etc.	balances <i>pitta</i> and <i>kapha</i>
9.	<i>Dalchini</i> ^{xx}	<i>cinnamom m zeylanicu m</i>	improves digestion, useful in diabetes, high cholesterol, relieves throat and oral pain, anti-toxic, relieves headache & rhinitis etc.	balances <i>vata</i> and <i>kapha</i> & increases <i>pitta</i>
10.	<i>Marich</i> ^{xxi}	<i>piper nigrum</i>	removes toxins, heals and stimulates organs, improves taste perception, decreases sputum production & useful in chronic respiratory disorders etc.	balances <i>kapha</i> and <i>vata</i>
11.	<i>Lavang</i> ^{xxii}	<i>syzygium aromaticu m</i>	relieves excessive thirst, tastelessness and bad breath, useful in cough, asthma digestive etc.	balances <i>vata</i> and <i>kapha</i> & increases <i>pitta</i>
12.	<i>Drakshaa</i> ^{xxiii}	<i>vitis vinifera</i>	improves taste in the mouth, relieves intoxication, anti-pyretic, nourishes the body etc.	balances <i>vata</i> and <i>pitta</i>
13.	<i>Rasona</i> ^{xxiv}	<i>allium sativum</i>	an anti-aging spice, good for eyes, useful in cough, asthma digestive, relieves hiccups & useful in fever etc.	balances <i>vata</i> and <i>kapha</i> & increases <i>pitta</i>
14.	<i>Yashthimadhuxx</i> ^{xxv}	<i>glycyrrhiz a glabra</i>	provides good strength and immunity, relieves exhaustion, provides energy, anti-pyretic etc.	pacifies <i>vata-pitta</i>

Immunity Contemporary and Ayurvedic View: An *Ayurvedic* assessment of the disease can help to classify the clinical presentations of covid-19 on the basis of the *tridoṣa*

Table no 3. Some Compound medicines to improve immunity^{xxvi}

S.N	Name of drug	Dose	Anupana	Used in /as
1.	<i>Chyawanprasa</i>	12- 24 gm	Milk	a powerful immune booster and aids the body in haemoglobin and white blood cells production. <i>Amla</i> , the key component in <i>chyawanprash</i> detoxifies the body and cleanses the blood, liver, spleen and the lungs. It enhances youthfulness and promotes healthy muscle mass and tones the body.
2.	<i>Chitrakaharitaki</i>	6-12 gm	water, milk	chronic respiratory symptoms, cough, asthma, bronchitis etc.
3.	<i>Agastya haritaki rasayana</i>	6-12 gm	warm water or milk	mainly <i>vata kaph</i> dominant diseases, <i>shwasa</i> , <i>kasaroga</i> ; also as <i>naimittika rasayana</i> in various other diseases like <i>grahani</i> , <i>aruchi</i> , <i>arsha</i> etc
4.	<i>Vasarishtha</i>	10- 30 ml	warm water	cough, asthma, bronchitis, haemoptysis, phthisis (tuberculosis), laryngitis, tonsillitis, dyspnoea & respiratory tract infections, hoarseness of voice, hiccup, breathlessness & epistaxis.
5.	<i>Guduchi ghanvati</i>	2 tab	warm water	Immuno-modulator, antioxidant, antipruritic, mild analgesic, & anti-inflammatory
6.	<i>Kanakasava</i>	12- 24 ml	warm water	bronchodilator, expectorant, analgesic, antispasmodic, sedative, cardiac stimulant, digestive.
7.	<i>Kantakarya avaleha</i>	6- 24 gm	milk, water	respiratory problems like cough and asthma due to its expectorant property and helps to release mucus from the respiratory passages and prevent asthmatic attacks.
8.	<i>Haridra khanda</i>	6 gm	milk, water	anti-allergic, effective on allergic skin ailments like rashes, itching urticaria, boils and allergic rhinitis. Turmeric contains more than 300 antioxidants that make it a powerful healer.
9.	<i>Sitopaladi churna</i>	1-3 gm	ghee, honey	Immuno-modulator, restores lung capacity, improves pulmonary performance and boosts immunity.
10.	<i>Talisadya churna</i>	3 gm	honey	antitussive, bronchodilator, expectorant(mild), mucolytic,antiviral, antibacterial & antimicrobial
11.	<i>Patoladi kwath</i>	15- 30 ml	honey	Skin disorders and fever.
12.	<i>Amritarista</i>	12-24 ml	warm water	chronic fever, typhoid fever and other infectious diseases and a natural immunity booster. Helps the body to fight off bacterial & viral infections.
13.	<i>Sudarsanachurna</i>	2-4gm	warm water	fever and also good for spleen and liver.
14.	<i>Giloy satva</i>	1 gm	honey	anti-pyretic

framework (the three doṣas called vata, pitta and kapha represent the self-regulatory mechanisms of the body, the failure of which leads to development of disease). Five clinical conditions described in these texts were examined to develop correlation with Covid-19. These were fever (jwara), cough (kasa), dyspnoea (svasa), consumption (rājayakṣmā) and poisoning (viṣa) including *Ayurvedic* descriptions of the co-morbidities that indicate poor prognostic outlook for Covid-19.^{ix} The immune system organs make up our entire body and defend us from infections, as well as play a crucial role in maintaining our health. According to *Ayurveda*, immunity depends on *ojas*, equilibrium state of *kapha* and *udanavata*. *Ayurveda* discusses about the concept of *vyadhiksamatwa* (immunity) in the name of *ojas* and *bala*. Diseases of immune system arise due to disturbance in *ojas*, *kapha*, *bala* and *udanavata*^x.

Role of *Ayurvedic* drugs as immunity enhancers: Ministry of AYUSH recommends the following self-care guidelines for preventive health measures and boosting immunity with special reference to respiratory health.

DISCUSSION

SARS-CoV-2 is a virus that affects mammals, birds, and reptiles. It belongs to the coronaviridae family of single-stranded RNA viruses. Although corona viruses can cause enteric and neurological disease, more serious infections are uncommon.^{xxvii} Under the heading *janapadodhwansa*, *Ayurveda* has specifically narrated pandemic diseases. The cause differs, but the mechanism by which such pandemics propagate is the same as it has been for mankind throughout history, namely water, air, soil, and living beings. Corona virus attacks the body's immune system and a strong immunity is required to avoid or survive pandemic situations. The innate immune response, which provides immediate protection against invading pathogens and the adaptive or acquired immune response, which takes longer to evolve but provides exquisite precision and long-term protection, are the two types of immune response.^{xxviii} Immunity, defined in *Ayurveda* as *vyadhiksamatwa*, refers to the body's ability to prevent disease or pathogenesis. *Ayurvedic* medicines allow for the evolution of physiological responses in order to boost immunity. In this article, some *Ayurvedic* single and herbo-mineral medicines are explored from either a preventive and curative perspective. These *Ayurvedic* medicines have antipyretic, antitussive, bronchodilator, expectorant (mild), mucolytic, antiviral, antibacterial, anti-microbial and other properties that can be used by both covid patients and healthy persons.

CONCLUSION

WHO declared the corona virus a global pandemic. *Ayurvedic* medicines (single herbs and compound drugs) have enough potential to be used as a preventive, curative and immunity booster in the fight against covid-19. During this pandemic, the AYUSH ministry has also recommended immunity-boosting steps for self-care.

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