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Ayurvedic perspective and management of COVID-19 : A Critical Review

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ABSTRACT

Recently, there is an emergence and outbreak of a new viral disease i.e. COVID-19 which is spreading faster than ever in many different regions of the world. COVID-19 is an infectious disease caused by a newly discovered coronavirus which spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. It is a respiratory disease and most infected people will develop mild to moderate symptoms but according to WHO data, maximum number of patients related to Covid-19 are associated with common symptoms including fever, dry cough, shortness of breath, tiredness and sore throat. This new virus seems to be very contagious and has quickly spread globally. At present there are no specific vaccine or treatment for Covid-19 in contemporary science, however it is known that Ayurveda provides a potential holistic approach from many centuries and proven to be the most efficient tool in health management system. Therefore, an effort has been made to find possible Ayurvedic comparison to the current most prevalent COVID-19 disease based on particular signs and symptoms and to explain its management.

Key words: *Chaturthaka Jvara, COVID-19, Coronavirus , Janapadoddhvansa, Rasayana.*

INTRODUCTION

According to the World Health Organization (WHO), there is emergence of new viral infections which indicates a serious threat to public health. In the last twenty years, several viral epidemics such as the severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002 to 2003, and H1N1 influenza in 2009, the Middle East respiratory syndrome coronavirus (MERS-CoV) first identified in Saudi Arabia in 2012 have been recorded.[1] The CoVs (coronavirus) have become the major pathogens of emerging respiratory disease outbreaks that cause illness ranging from the common cold to more severe diseases.[2] They are a large family of single-stranded RNA viruses (+ssRNA) that can be isolated in different animal species.[3]

The 2019–20 corona virus pandemic is an ongoing pandemic of corona virus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[4] In genetic terms, Chan et al. have proven that the genome of the new HCoV, isolated from a Cluster-patient with atypical pneumonia after visiting Wuhan, had 89% nucleotide identity with bat SARS-like-CoVZXC21 and 82% with that of human SARS-CoV.[5] For this reason, the new virus was called SARS-CoV-2. A novel coronavirus (2019-nCoV) is a new strain that has not been previously identified in humans. The outbreak started in Wuhan, Hubei province, China, on 31 December 2019. The WHO declared the outbreak as a Public Health Emergency of International Concern (PHEIC) on 30th January 2020 and recognized it as a pandemic on 11 March 2020.[6,7] Because of its contagious nature, it has quickly spread globally and a large number of individual are getting infected at the same time thus

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creating great strain over public health. Studies revealed significant overlapping of imaging features of COVID-19 with SARS and MERS.[8]

As it spread over different regions of the world as pandemic, in Ayurvedic context, it can be correlated to *Janapadoddhvansa Vikara* (mass destruction).[9] As per etiopathogenesis, it comes under *Agantuja Jvara* (variety of fever occurring due to external factors) with special reference to *Abhisangaja Jvara* (microbial etiology).[10] Clinical symptoms of Covid-19 are similar to *Vishama Jvara (*with special reference to *Chaturthaka Jvara)* when there is involvement of *Rasa* (lymph), *Asthi* (bone) and *Majja Dhatu* (bone marrow tissue).[11]

There is an urgent need of prevention and control of this disastrous combination of newly occurring disease, but unfortunately, no integrative measures have been validated in human trials as effective specifically for COVID-19. Hence, an attempt has been made in this article to find possible Ayurvedic comparison to the current most prevalent Covid-19 disease based on particular signs and symptoms and to explain the role of *Rasayana Chikitsa*, *Krimihara Chikitsa* and *Vyadhi Pratyanika Chikitsa* to combat COVID-19.

AYURVEDIC PERSPECTIVE OF COVID-19

In context of *Janapadoddhvansa Vikara*

As Covid-19 has evolved itself into a pandemic, affecting a large population irrespective of their physical features, dietary patterns, psychological attributes etc., therefore in Ayurvedic context, it can be correlated to *Janapadoddhvansa Vikara. Acharya Charaka* has described epidemic disease as *Janapadoddhvansa* (mass destruction). The *Mula* (causative factor) of *Janapadoddhvansa* is *Adharma* (unrighteousness) and *Yoni* (origin) is *Pragyaparadha* (intellectual error)[12] due to which four components i.e. *Vayu* (air), *Jala* (water), *Desha* (habitat) and *Kala* (seasons) get *Vikrita* (vitiated or deranged) resulting in destruction of entire *Janapada* (community).[13] *Acharya Sushruta* mentioned that even *Prakrita* (normal) *ritvadi* components may result in *Janapadoddhvansa* due to *Bhutabhishangaja* (microbial attack).[14]

In context of *Aupasargika Roga*

Acharya Sushruta has mentioned *Aupasargika Roga* (communicable disease) and their mode of transmission in *Kustha Nidana*. These are contagious diseases which spread through direct contact or contaminated objects of patients, by physical contact, expired air, sharing bed, clothes or eating with affected person in same vessels and these diseases spread from person to person. *Jvara* is one among these disease.[15] COVID-19 is also highly contagious evidenced by its rapid transmission along with many exported cases across the world.

In context of *Agantuja Jvara*

Fever caused by external factors is called *Agantuja Jvara*. Among 4 types of *Agantuja Jvara*, COVID-19 can be grouped under *Abhishangaja Jvara* due to attack of *Bhuta* (microbes).[16]

In context of *Vishama Jvara*

Acharya Sushruta considered that *"Agantushchanubandho Hi Prayashovishama Jvare"* means *Aagantuja Karana* (external cause) is responsible for *Vishama Jvara.*[17] According to *Acharya Sushruta "Kechid Bhutabhishangottham Bruvate Vishama Jvaram"*- means in *Vishama Jvara* there is involvement of microbes.[18] *Acharya Chakrapani* have also commented on *Vishama Jvara* as *Bhutanubhandha* and further explained that in *Vishama Jvara,* firstly there is microbial invasion and clinical symptoms appears later[19] which is justified by incubation period concept of COVID-19.

Symptoms of Covid-19

The most common symptoms of COVID-19 are fever, tiredness, and dry cough. Some patients may have aches and pains, nasal congestion, runny nose, sore throat or diarrhea. These symptoms are usually mild and begin gradually. Around one out of every six people who gets COVID-19 becomes seriously ill and develops difficulty breathing. Older people, and those with underlying medical problems like high blood

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pressure, heart problems or diabetes, are more likely to develop serious illness.[20]

As per above clinical features of Covid-19, most of the symptoms are present in *Vishama Jvara* with special reference to *Chaturthaka Jvara*. Though the classical features of *Chaturthaka Jvara* doesn't match with COVID-19, but in the context of *Vishama Jvara,* it is explained that *Pravritti Kala* of *Jvara* depends on the site of the *Doshas* in specific *Dhatu*, therefore when *Jvara* infiltrate in to bones and bone marrow i.e. *Asthi and Majja Dhatu* it is called *Chaturthaka Jvara*. It is very dangerous and also brings on a simultaneous attack of complications.[21] As in the general pathological process of *Jvara, Rasa* (lymphatic fluid) is considered as prime and primary *Dhatu* and that phenomena also occurred in this condition. *Chaturthaka Jvara* is of two types - when *Kapha* is vitiated, calf region is afflicted first and when *Vata* is vitiated, head is afflicted first.[22]

Sign and symptoms manifested if vitiated *Doshas* causing *Jvara* are located in *Asthi Dhatu* (bone tissue) are *Vireka* (diarrhea), *Vamana* (vomiting), *Asthi Bheda* (pain in joints), *Prakujana* (cooing sound as present in pneumonia), *Shvasa* (difficulty in breathing), *Gatra Vikshepa* (movement of body and limb)[23] and if located in *Majja Dhatu* (bone marrow) are *Hikka* (hiccup), *Shvasa* (difficulty in breathing), *Kasa* (cough), *Tama Darshana* (comatose condition), *Marma Cheda* (affection of Vital organs), *Antardaha* (fever) and *Bahirshaityam* (cold extremities).[24] Most of the symptoms noticed in corona virus disease (Covid-19) has close resemblance with *Asthi* and *Majjagata Jvara* as mentioned in Table 1.

Table 1: Symptoms of *Asthigata* and *Majjagata Jvara*

Types of *Jvara*	Common symptoms	Severe symptoms	Complications	Other symptoms
Asthigata Jvara	*Vireka* *Asthi bheda* *Gatra vikshepa*	*Vamana* *Shvasa*	*Prakujana*	-
Majjagata Jvara	*Kasa*	*Shvasa* *Antardaha*	*Marma chedana* *Tama darshana*	*Bahir* *Shaityam* *Hikka*

Ayurvedic treatment principle of COVID-19

As epidemics of viral diseases occur at a gap of years, these infections are not at the priority among the research community and that is the reason why there is as yet no effective vaccine or treatment for emerging viral diseases like covid-19 in contemporary science.[25] Due to the viral nature of disease and its fast spread it has become a challenge before medical fraternity to fight this pandemic. It is important to stop the progression of disease at earliest possible stage. Stopping the progression of the disease is the most ideal step of controlling the disease, moreover increasing immunity by various means are also required,[26] so holistic approach of Ayurveda provide a potential remedy to combat this health emergency.

Rasayana therapy

Use of *Rasayana* therapy is mentioned by *Acharya Charaka* as treatment modality.[27] To maintain health and to cure disease through *Rasayana* therapy along with main treatment is the unique approach of Ayurveda.[28] As there is severe immune injury revealed by pathogenesis of COVID-19, these rejuvenation therapies may play significant role in treatment. Moreover, prevention is always better than cure and immunity plays a major role in prevention of disease and in diseased condition also. *Acharya Charaka* mentioned that chances of having disease is determined by *Vyadhikshamtva* power (immunity).[29] *Rasayana* is a preventive therapy which provides strength and immunity and is helpful in maintaining health along with fight against infection. From above description it is quite clear that the function of the immune system is critical in the human response to COVID-19.

Krimihara Chikitsa

In Ayurveda, *Krimi* is broadly described for worms and micro-organism. These may be *Drishta* or *Adrishta.*[30] Hence *Krimihara Chikitsa* may have potential to kill or

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restrict growth of microbes (virus, bacteria, and fungi). *Acharya Charaka* describes three different modalities[31] which may be effective in COVID-19 treatment.

1. *Nidana Parivarjana*

To avoid the known disease causing factors is known as *Nidana Parivarjana* which is mentioned as *Pradhana Chikitsa* (first and foremost treatment) among all.[32] For reducing the chances of getting infection, knowledge of disease causing factors is must. In context of covid-19, isolation and social distancing are given most weightage by WHO to limit the spread of disease. Use of mask, handwashing, sanitization are also other important preventive measures which are also described as a part of *Dincharya* (daily routine) mentioned in classical text.

2. *Apakarshana*

It is process of removing disease producing entities by using various therapeutic processes like *Vamana* (therapeutic emesis), *Virechana* (therapeutic purgation).[33] As covid-19 resides in throat for few hours, if daily practice of gargling with hot water and mild *Vamana* with *Saindhava Lavana* is done it will restrict the attachment of Spike protein of corona virus to host ACE2 receptors and further pathogenesis. This may be employed depending on clinical presentation of disease.

3. *Prakrtivighata*

Use of specific drug which stop growth of disease producing pathogens by creating an unfavorable condition for their growth, which is an efficient method of managing disease known as *Prakritivighata*. As nature of virus is *Kapha-Vataja* (*Kaphaja* due to its structural composition that includes 4 types of proteins and capacity of making attachment to substratum and resides in *Kaphasthana*[34] *Urahpradesha, Griva, Shiro Pradesha* and *Vataja* due to rapid spread, transmission by touch and air, rapid division and pathogenesis capability). Hence the drugs having *Kapha-Vata Shamaka* properties (i.e. *Katu, Tikta rasa, Laghu, Ruksha, Tikshna Guna* and *Ushna Virya*) may restrict growth of pathogen (COVID-19).

Vyadhi Pratyanika Chikitsa

In this treatment, *Aushadha* which pacify a particular disease are administered. Clinical symptoms of COVID-19 resemble with *Chaturthaka Jvara* when it enters in *Asthi* and *Majja Dhatu*. Hence, treatment protocol of *Chaturthaka Jvara* described in *Jvara Chikitsa* by *Acharya Charaka* may prove beneficial.[35] 20 ml *Kwatha* (decoction) made from 5 gm *Guduchi* [*Tinospora cordifolia* (Thunb.) Miers], 5 gm *Amalaki* (*Emblica officinalis* Gaertn) and 5 gm *Musta* (*Cyperus rotundus* Linn.) may constitute the treatment of *Chaturthaka Jvara*. The pharmacological properties of above drugs are mentioned in Table 2.[36]

Table 2: Pharmacological properties of above mentioned drugs.

Chaturthaka Jvarahara Yoga	***Guduchi***	***Amalaki***	***Musta***
Botanical Name	*Tinospora cordifolia* (Thunb.) Miers	*Emblica officinalis* Gaertn.	*Cyperus rotundus* Linn.
Family Name	Menispermaceae	Euphorbiaceae	Cyperaceae
Rasa	*Tikta, Kashaya*	*Amla Pradhana, Madhura, Katu, Tikta, Kashaya*	*Tikta, Katu, Kashaya*
Virya	*Ushna*	*Sheeta*	*Sheeta*
Vipaka	*Madhura*	*Madhura*	*Katu*
Guna	*Guru, Snigdha*	*Guru, Ruksa, Sheeta*	*Laghu, Ruksha*

Properties of *Guduchi*

The water-soluble fraction of 95% ethanolic extract of *T. cordifolia* plant has shown significant antipyretic activity.[37] In another experimental study, antipyretic effects have been reported in the hexane- and chloroform-soluble portions of *T. cordifolia* stems.[38]

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The extract has also exhibited in vitro inactivating property against hepatitis B and E surface antigens in 48 to 72 hours.[39] The alcoholic and aqueous extracts of *T. cordifolia* are reported to have beneficial effects on the immune system and have been tested successfully for their immunomodulatory activity.[40] TCE (*T. cordifolia* extract) has been shown to demonstrate a decrease in the recurrent resistance of HIV virus thus improving the therapeutic outcome.[41] Anti-HIV effects of TCE was revealed by reduction in eosinophil count, stimulation of B lymphocytes, macrophages and polymorphonuclear leucocytes and hemoglobin percentage thus, revealing its promising role of application in management of the disease.[42]

Properties of *Amalaki*

Studies on *Amalaki* demonstrate in vitro antiviral and antimicrobial properties.[43] *Amalaki* has antioxidant, cytoprotective,[44] anti-hepatitis, anti-cancer, anti-tumour activity.[45] Various experimental studies also have suggested antioxidant[46] and hypolipidemic effects[47] of *Amla*. In another study, the immunomodulatory activity of aqueous extract of *E. officinalis* was reported. It showed that *E. officinalis*-treated mice had significantly higher antisheep RBC (red blood cell) titer and DTH (delayed type hypersensitivity) reaction compared to the control. This was concluded because of significant increase in WBC count and lymphocyte distribution in *E. officinalis*-treated mice, suggesting its ability to stimulate haemolymphopoetic system.[48]

Properties of *Musta*

Totaloligomeric flavonoid extract of *C. rotundus L.* possessed a broad spectrum of pharmacological properties such as antioxidant, antimutagenic, antigenotoxic, antimicrobial, anticancer, and neuroprotective properties.[49] Data showed very promising hepatoprotective and anti-HBV potential of *C. rotundus* rhizome extracts in vitro. Taken together, while the n-butanol and aqueous fractions exhibited hepatoprotective as well as anti-HBV activities, the ethyl acetate fraction showed only antiviral effect.[50] A study reported significantly ($p < 0.001$) high anti-pyretic activity of 95% alcoholic extract of *C. rotundus* against pyrexia induced in albino rats through injection of suspension of dried Brewer's yeast in gum acacia in normal saline subcutaneously.[51] The pure compounds isolated from the tubers of *C. rotundus*, the root bark of *Zanthoxylum gilletii*, and the root bark of *Margaritaria discoidea* to demonstrate the anti-malarial activity.[52] Activity-guided investigation of *C. rotundus* tubers led to the isolation of sesquiterpenes such as patchoulenone, caryophyllene alpha-oxide, 10,12-peroxycalamenene and 4,7-dimethyl-1-tetralone. These compounds exhibited anti-malarial activity.[53] Hydro-alcoholic extract of *C. rotundus* along with 41 Egyptian medicinal plants were screed for anti-viral activity. The extract was tested on three viruses—HSV (herpes simplex-1 virus), POLIO (poliomyelitis-1 virus) and VSV (vesicular stomatitis virus). Determination of anti-viral activity was done by end point titration technique. *C. rotundus* showed virucidal activity against Herpes Simplex Virus.[54]

Conclusion

"*Na Hi Sarva Vikaraṇam Namato Asti Dhruva Sthiti*" means there are innumerable diseases according to variations in etiology and location, so it is not possible to give standard names to all. Hence after acquiring complete knowledge of nature of disease, its pathogenesis, location and etiological factors, one should rationally follow Ayurvedic principle for diagnosis of disease as well as its treatment protocol as mentioned in classical text. *Guduchi, Amalaki* and *Musta* are economic, classical and available all over India. Their properties can be further evaluated by clinical findings or trials so further research is required in order to reach into more conclusive evidences. There is need for developing guidelines to smartly and efficiently tackle these new emerging viral diseases and to implement Ayurveda, in public health against infectious diseases.

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