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Role of Ayurveda in prevention of Covid-19 pandemic - An Integrative Overview

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ABSTRACT

Introduction: Recently all world is suffering from Pandemic Covid 19. COVID-19 is an infectious disease caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) that is novel corona virus. First case was detected in Wuhan, China. The symptoms are similar as like flu. Most common symptoms are fever, dry cough, breathlessness, sore throat, weakness, bodyaches. These symptoms vary according to individuals. COVID 19 is declared as Pandemic. In Ayurveda, Pandemic is explained in *Charaka Samhita Viman Sthana* under *Janpadodhwansniya Adhyaya*. There is no medication for Covid 19. So, we can prevent and defend this disease by boosting own immunity. Ayurveda explained immunity under the heading of *Vyadhikshamatva*. In Ayurveda various types of regimens like *Dinacharya, Ritucharya, Aharavidhi, Rasayana Chikitsa, Vyayama, Yoga, Pranayama*. These all are very much helpful to enhance the immunity. **Methods:** In this article, information from contemporary texts of Ayurveda in view of *Vyadhikshamatva* and immunity have been documented to understand treatment approach of Ayurvedic science. **Result:** The Pandemic like Covid 19 is difficult to manage in current days. But it is possible to prevent and manage by boosting the immunity. **Conclusion:** This pandemic of Corona virus disease SARS COV2 has no treatment and vaccination available till now. Only prevention is the way by adoption of social distancing as the contaminating rate is very high. So one should understand the importance of healthy life style, good diet habits and daily exercise etc. to acquire immunity. Immunity can be acquired with some herbs and medicines, by following regimen, Proper *Rasayana* etc. Hence, it is necessary to aware people about health hygiene, following healthy regimen, boosting the immunity which is explained in Ayurveda. In the present review article, an attempt has been made to present concept of *Vyadhikshamatva* specially in current Pandemic COVID 19.

Key words: *Vyadhikshamatva, COVID 19, Bala, Ojas, Immunity, Rasayana.*

INTRODUCTION

Currently whole world is suffering from Pandemic COVID 19 where mortality rate is higher.^[1] COVID 19 was first identified in early December 2019 and by the middle of March 2020, the World Health Organization

assessed COVID 19 as a Pandemic. On February 11, 2020, WHO named the Wuhan Pneumonia as Coronavirus disease-2019 (COVID 19). The majority of cases were reported in US, Spain, Italy and UK. There is no proper treatment protocol available still for COVID 19 and no vaccine is developed in contemporary science to combat over this situation. Only we can focus to maintain health hygiene and social distancing.^[2] So, Prevention is the best way to overcome such pandemic. Therefore it is necessary to develop a safe and effective treatment approach in alternative science i.e. Ayurveda for prevention and curative purpose to this type of infection.

Ayurveda is a science of Life. Ayurveda is a classical system of health care originating from Vedas documented around 5000 years ago. Ayurveda aims to keep structural and functional entities in a state of

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equilibrium, which signifies good health. Any imbalance due to internal or external factors can cause disturbance in the natural equilibrium giving rise to disease and the treatment consist of restoring the equilibrium through various procedures, regimen, diet, medicines and behavior change. The Preventive aspects of Ayurveda is called Swasthritta and includes personal hygiene, daily and seasonal regimens, appropriate social behavior and use of materials and practices for healthy aging and prevention of premature loss of health attribute.

The concept of epidemic which is mentioned by Acharya Charaka in Janapadodhwansa Chapter 3rd in Vimanasthana. To fight with this dreadful situation, prevention is the only one option and also immunity plays an important role to fight. If there is prolonged weakened immune system which give rise to a greater susceptibility to various infections specially related to respiratory system, herpes and fungal infections. Nowadays, status of health becomes poor and more chances of getting susceptible to such communicable diseases due to changing lifestyle, improper diet, lack of exercise, stress, unhygienic conditions. Therefore, it is need to apply various preventative aspects of Ayurveda based on its fundamental principles like Sadvrutta, Panchakarma, Dincharya, Rutucharya, Rasayana, Yoga- Pranayama which gives power to person for fighting against this virus. Here, sincere efforts have been done to present certain preventive as well as immune boosting modalities mentioned in Ayurveda sculptures.

Vyadhi means disease and *Kshamatva* means inherent capacity of body. So concept of *Vyadhikshamatva* described in Ayurveda is equivalent to immunity. *Vyadhikshamatva* which is mostly depends on *Bala* of body i.e. *Sharirabala*. There are three types of *Bala*. These are *Sahaj Bala* (Constitutional), *Kalaj Bala* (Temporal strength) and *Yuktikrita Bala* (Acquired strength). Similar way, Concept of *Ojus* has been explained by Acharya which is vital in defence mechanism of body.

Immunity can be acquired by using various types of herbal, mineral drugs, following *Rasayana* therapy,

Dietary measures, Exercise, proper hygiene etc. which is already explained in Ayurveda. Many herbs like *Ashwagandha*, *Amalaki*, *Mandukparni*, *Punarnava*, *Guduchi*, *Pippali*, *Yashtimadhu*, *Gokshur*, *Haridra* etc. which are explained under *Rasayana* and proved to be good Immuno stimulants. So, here small effort has been done to understand the concept of *Vyadhikshamatva* and Role of *Rasayana* group of herbal drugs, which is relevant and very important in current pandemic Covid 19.

MATERIAL AND METHODS

To understand role of *Vyadhikshamatva* in Covid 19, here referred various textbooks and ancient *Samhitas* of Ayurveda, Internet, and various website by online, published research papers and articles. It is necessary to understand concept of *Vyadhikshamatva* in Covid19. For that purpose, firstly we shall know about the current pandemic disease is nothing but Covid 19 and thereafter, the Ayurvedic concept of *Vyadhikshamatva* in the management will also be elaborately discussed.

Modern Perspective of Covid-19 Or Sars Cov2

Coronavirus (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases. A novel corona virus (nCoV) is a new strain that has not been previously identified in humans. The new virus was subsequently named the "COVID-19 virus."

In India, first case was committed On 20th January. First death occurred in Wuhan due to COVID 19., on 12th January.

Corona virus is a large family of high enveloped single strand RNA virus found in human and animals. Four generations are there - alpha, beta, delta and gamma. It is named as SARS CoV2.

SARS - COV 2002 - Appeared in China

MERS - COV 2012 - Appeared in Saudi Arabia

COVSAR (Covid) - 2020 Appeared first in China.

Process of immune system in human body

Our whole body consists of the organs of the immune system to protect against diseases. It plays a key role to maintain health and pathogenesis. It also protects

our body from harmful substances, germs and cell changes (neoplasm). The key player in the immune system is the white blood cells (WBC) which can travel throughout the body using the blood vessels. To monitor for invading microbes, our body exchanges cells and fluids between blood and lymphatic vessels and enables the lymphatic system. The lymphatic vessels carry lymph. Each lymph node contains specialized compartments where they can encounter antigens. Through the incoming lymphatic vessels, the immune cells and foreign particles enter the lymph nodes. When they are in the bloodstream, they are transported to tissues throughout the body. They continue the cycle all over through patrolling for foreign antigens every-where and then gradually drift back into the lymphatic system. The immune cells gather, work, and serve to confront antigens in lymph nodes and spleens compartments.

Mechanism of immune systems in human body against Covid-19^[3]

As there is no registered medicine or vaccine against COVID-19, our immune system is the best defense. The immunity system supports our body's natural ability to defend against pathogens which include viruses, bacteria, fungi, protozoan, and worms, resist infections. As long as the immune system runs smoothly, we do not notice infections like COVID-19. Our immune system can be categorized into three categories. They are, namely, innate immunity (rapid response), adaptive immunity (slow response), and passive immunity. Passive immunity is again two types and they are natural immunity which we receive from our mother and artificial immunity that we receive from medicine. Skin and inflammatory response begins when our body is affected however, when our body encounters any germs or viruses for the first time, the immune system cannot work properly and we become sick. The same thing has happened in the case of COVID-19.

When the cells of the immune system become educated, it completes its jobs by recirculating between central and peripheral lymphoid organs and migrating it and from sites of injury via blood. Blood carries naive and educated immune cells from one

site to another, as it flows throughout the body; it acts as a pipeline for the immune system. The cells again enter into the blood stream to be transported to tissues throughout the body after exiting these nodes through outgoing lymphatic vessels.

Many molecular and cellular profiling assays are now abundant for the study of the human immune system. The level of advancement of instruments has happened such as polychromatic flow cytometers have improved over the past few years. In the fields of genomics and proteomics, major technological breakthrough have also happened, thus creating today a unique facility for the study of human beings in health and disease where inherent heterogeneity dictates that large collections of samples be analyzed. After being affected by virus immune responses to mediate anti-body. The B cells are assisted by T cells to differentiate into plasma cells, which in return produce antibodies specific to a viral antigen. Neutralizing nature antibody is efficient in fully blocking the virus from entering into host cells to limit the infection and plays a very intense protective role at the later stage of infection and prevents relapse of infection in the future. In contrast, a cellular immunity response can be seen inside the infected cells, which is mediated by T-lymphocytes. The overall adaptive immune response is directed by helper T cells, while cytotoxic T cells play a vital role in the clearance and cleaning of viral infected cells.

Information from SARS-CoV and MERS CoV may allow exploration of knowledge to understand how SARS-CoV-2 escapes the host's immune response as data on SARS-CoV-2 are still very few. 80% RNA sequence of SARS-CoV and 50% of RNA sequence of MERS-CoV matches with the RNA of SARS-CoV-2 and SARS-CoV-2 exhibit additional genomic regions. Compared to SARS-CoV and other closely related coronaviruses, its spike protein is 20-30 amino acids longer. Thus, SARS-CoV-2 has similar immune evasion strategies, but an additional mechanism is still undiscovered.

Clinical symptoms and mode of transmission

The only treatment is to take preventive measure due to its self-limiting disease called as Novel Covid -19. It is known as the Severe Acute Respiratory Syndrome

Coronavirus 2 (SARS-CoV-2)^[4] Symptoms of Covid 19 is similar like the common flu and these are fever, cough, sneezing, fatigue and shortness of breath. Structurally, it is a positive sense single stranded RNA virus,^[5] emerged from bat borne virus as having the genetic similarity to bat coronavirus. The strain of the virus found first in “Wuhan”, a city in China and hence, known as Wuhan virus.^[6] This is 50-200 nanometres in diameter.^[7]

Mode of transmission is Respiratory Droplet infection through cough and sneeze within 2 meter^[8] and through the Contaminated Surfaces. SARS-Co-V-2 has four structural proteins: Spike (S), Envelop (E), Membrane (M) and Nucleocapsid (N) in which the first three are the viral envelop and (N) is RNA genome.

Pathology^[9]

Spike protein facilitate the host cell → Use ACE2 (angiotensin converting enzyme) receptors of human^[10] (Most abundant in Alveolar Cells of Lungs) → To enter cell → And attach to target cell and cell's protease TMPRSS2 open the spike protein of virus → Virion release RNA into the cell and Forcing cell to produce copies of the virus and Infect more cell^[11] → Atleast three virulence factor produced and Promote shedding virion from host cells → Inhibit Immune Response.

Diagnosis

Nasopharyngeal and oropharyngeal swab is taken for laboratory investigations. Additional specimens are blood, stool, urine are recommended. It is fatal in age above 80 yrs. of age.

Treatment

The most and first line of treatment is Isolation. Mild illness cases should be treated at home. Still, There is no specific treatment is available for Covid 19. Vaccines are currently under study. Symptomatic treatment is being given now. Therapies used for this illness include Antiviral or retroviral medications, breathing support such as mechanical ventilation, intravenous fluids, Steroids to reduce lung swelling, Blood plasma transfusion, Other antimalarial drugs - hydroxychloroquine used to relieve viral replication.

High Risk Factor - Some diseases are in high risk factors and these are Diabetes mellitus, Hypertension, Asthma, COPD, Cancer, Aids, etc.

Ayurvedic perspective in Context of COVID 19 or SARS-COV-2

Concept of Vyadhikshamatva in Ayurveda

Acharya Chakrapani has defined is that *Vyadhikshamatva* which denotes the resisting power of the body, which reacts to arrest the progress, occurrence or reoccurrence of diseases.

Here, two significant terms *Vyadhi-Bala-Virodhitva* and *Vyadhiutpada - Pratibandhakatva* have been mentioned. *Vyadhi-Bala-Virodhitva* means reducing the strength of diseases those already manifested. *Vyadhiutpada-Pratibandhakatva* indicates prevention of those diseases yet to be manifested^[12] Here, concept of *Vyaadhikshamatva* is not only immunity against a specific infectious agent or disease like the concept of modern medicine. But also it implies a resistance against the loss of the integrity, proportion and interrelationship amongst the individual's bioenergies (*Doshas*) and tissues (*Dhatu*s).

Ojas

Ojas is the essence of all bodily tissues (*Saptadhatu*s) and it is the seat of *Bala* (strength/immunity).^[13] It is considered vital in the defense mechanism of the body in Ayurveda. There are various diseases like Diabetes mellitus and malnutrition, where loss of Ojas is a constant feature; people are known to be susceptible to various other interrelated and degenerative diseases or recurrent infections. So, any deficiency or alteration in the quantity and quality of Ojas of a particular Dhatu or Ojas in general may lead to one or the other immuno compromised disorders or syndromes, which is clearly understood from the references where they have described Ojakshya or Ojonasha as one of the factor of aetiopathogenesis or as one of the main *Dhatu* disturbance or as complication in the disease like *Abhinyasajwara* also called *Hatoujasajwara* (complicated fevers of brain), *Sosha* (Emaciation causing diseases), *Moorcha* (syncope), *Pandu* (anemia), *Rajyakshma*

(tuberculosis), *Madhumeha* (diabetes mellitus), *Madya Janya Madataya* (Alcoholism) etc.

Bala

Acharya Charaka, described *Bala* which help to maintain health. It is acquired from three sources^[14]

1. *Sahaja Bala* (Constitutional strength): It comes from the parents and is inherited.
2. *Kalaja Bala* (Temporal strength): According to *Kalaja Bala*, the time of day, season, and one's age are important factors for enhancing immunity. Strength is greater in the early morning, spring, and youth than in evening, summer and old age.
3. *Yuktikrita Bala* (Acquired strength): It represents acquired immunity, in which disease can be defended against through Ayurveda like proper exercise, diet, usage of Rasayanas etc.

Prakrita Kapha

According to *Acharya Charaka* the *Shleshma* which is producing naturally in body which gives strength to the body. So the good quality of the *Prakrit Shleshma* in the body signifies the good quality of Ojas which give a good body immunity.^[15]

Samprapti Ghatak – Ayurvedic view in context of Covid 19

1. **Doshas** - *Vata, Pitta* Here, *Vata Dosha* involved so, it produces Dryness (Dry Cough) and shortness of breath. High grade fever which indicate involvement of *Pitta Dosha*.
2. **Dushya** - *Asthi* (with or without *Mamsa*)
3. **Prakruti** - In a *Vata Pradhana* (With or without association of *Kapha*)
4. **Roga Marga** - *Abhyantara*, In this *Vyadhi* involvement of *Phupusa* (Lungs), which shows pathways of disease is internal.
5. **Adhishtana** - *Phupasa* (Lungs) is the main organ for the manifestation of disease.
6. **Ritu** - In *Sisira* (Winter) / *Varsha* (Rainy) *Ritu* (*Vasanta*).

The treatment aspect of Ayurveda can be understood in three categories

1. *Ahara*
2. *Vihara*
3. *Aushada* - a) *Abhyantara* b) *Bahya*.

1) Ahara

- Frequent warm liquids treated with medicinal herbs (preferably *Shunthi, Dalchini, Trikatu*) should be used as a regular drink to maintain hydration.
- Freshly prepared *Laghu - Supachya Ahara* (easily digestible, light diet) should be consumed.
- Preferable vegetables are *Shigru* (*Moringa oleifera* Lam), *Karvellaka* (*Momordica charantia* Linn), *Patola* (*Tricosanthes dioica*. Roxb), *Mudga* (*Vigna radiata* (L.) R. Wilczek), *Patha* (*Cissampelos parietata* Linn.), *Vaastuka* (*Chenopodium album* L.), *Jivanti* (*Leptadenia reticulata* (Retz.) Wight and Arn), *Tanduliyak* (*Amaranthus spinosus* L.), *Kakamachi* (*Solanum nigrum* Linn), *Draksha* (*Vitis vinifera* L.), *Kapittha* (*Feronia limonia* (Linn.)), *Dadima* (*Punica granatum* Linn), *Lashuna* (*Allium sativum* L.) etc. are to be taken.^[16]
- Restrict using sweets and food which is heavy to digest.
- Also advise not to use chilled, fried, oily, fermented food items, cold and refrigerated food / beverages.

2) Vihara

- Avoid unnecessary gathering.
- Maintain social distance from each other.
- Maintain isolation.
- Avoid sleeping during the daytime (*Diwaswapa*)
- Avoid excessive physical activity including excessive walking or jogging.
- *Shirodhara* - Application of lukewarm oil on anterior fontanelle is known to reduce anxiety and stress.

- *Yogasana*

- a) *Pranayama* - Particularly *Bastrika* and *Kapalabhaati* can be performed for 10 min each.
- b) *Asanas* like - *Bhujangasana*, *Vajrasana* and *Padaangushtasana*, can be performed for respiratory wellness.

3) *Aushada*

Abhyantara Aushadi

Acharya Charaka in his treatise, has explained that *Tikta Rasa Aushadi* should be given during *Jwara Kala*. (Bitter taste dominant medications). Accordingly, considering the *Prakriti* of the individual, *Roga* and *Rogi Bala*, *Kala* and *Adhithana* of *Roga* the treatment of different type of *Jwara* is to be decided.

Since the COVID is *Vatapittaja Vyadhi*, following Ayurveda drugs may prove useful.

a) *Kirata - Swertia chirata - Gentianaceae*

The antipyretic activity of *Kirata* is documented by RL Singh, Pankaj Singh, Anju Agarwal that both the crude and purified extracts significantly inhibited cell proliferation and induced apoptosis. It may cure infectious diseases, tonsillitis, bronchitis, pneumonia, whooping cough, acute enteritis, gastritis, urethritis, nephritis, tuberculosis, gall bladder infection, influenza and high blood pressure. Besides, the anti-helminthic, hypoglycemic and antipyretic antifungal and antibacterial properties there are amarogentin (most bitter compound), swerchirin, swertiamarin and other active principles of the herb.^[17]

b) *Amrita - Tinospora cordifolia - Menispermaceae*

The antipyretic activity of *Amrita* is very well known and documented. However, its antipyretic activity is studied by Upadhyaya *et al.* reported that traditionally *T. cordifolia* is known for its *Jwarahara* activity (antipyretic activity). The water soluble fraction of 95% ethanolic extract of *T. cordifolia* plant has shown significant antipyretic activity. In another experimental study, antipyretic effects have been reported in the hexane and chloroform soluble portions of *T. cordifolia* stems. Various studies show remarkable anti infective and antipyretic properties of

T. cordifolia. Pre treatment with *T. cordifolia* was shown to impart protection against mortality induced by intra-abdominal sepsis following coecal ligation in rats and significantly reduced mortality from induced by *Escherichia coli* – induced peritonitis in mice.^[18]

A study by Neha Rawat and Rakesh Roushan reported that Guduchi is highly rich in anti-oxidants. It also has anti-pyretic, anti-viral, and wound healing properties.^[19]

c) *Katu Rohini - Picrorhiza kurroa - Plantaginaceae*

A study by Masood *et al.* documented that the plant is considered as an important medicinal plant which is mostly used in the traditional medicinal system for asthma, jaundice, fever, malaria, snake bite, and liver disorders. Different pharmacological activities of *P. kurroa* include anti-microbial, anti-oxidant, anti-bacterial, anti-mutagenic, cardio-protective, hepato-protective, anti-malarial, anti-diabetic, anti-inflammatory, anti-cancer, anti-ulcer and nephro-protective activities were recorded from this plant.^[20]

d) *Musta - Cyperus rotundus - Cyperaceae*

A review by Nagarajan *et al.* suggested that both *Aconitum heterophyllum* and *Cyperus rotundus* are reported to possess anti-inflammatory, antipyretic, antibacterial and antidiarrheal properties, while anti-inflammatory and antibacterial activities are attributed to *C. scariosus*.^{[21],[22]}

e) *Vasa - Adathoda vasica - Acanthaceae*

A potential drug with highly used in *Kasa* (Cough), *Swasa* (Respiratory distress/Asthma/Bronchitis) is reviewed by Ankit Gupta and P. K. Prajapati.^[23]

f) *Tulsi - Ocimum tenuiflorum - Lamiaceae*

It is an excellent immunomodulator. It is best for cough, cold and other respiratory ailments. It has proven antiviral, antibacterial, antipyretic properties. Use 2-3 tulsi leaves regularly in decoction/tea. Chewing Tulsi leaves on empty stomach is equally beneficial.

g) *Amalaki - Phyllanthus emblica - Phyllanthaceae*

It is a *Nitya Rasayana* which is rich in Vitamin C. It is said to be the best fruit as per Charaka. Helps boost

your immunity, metabolism and prevents viral and bacterial ailments.

h) *Turmeric - Curcuma longa - Ginger family*

Turmeric has antiseptic, anti-viral and anti-allergic properties. As per Ayurveda it is said to have *Deepana* (carminative) and *Pachana* (digestive) action. Half tea spoon *Haldi* (turmeric) powder in 150 ml hot milk - once or twice a day.

i) *Kali Mirch (Black pepper) - Piper nigrum - Piperaceae*

It has anti-malarial action when used along with *Tulsi*. Rich source of Omega 3 and 6 fatty acid. Its effects can be correlated to widely popular Hydroxychloroquine medicine.

j) *Shunthi/ Dried Ginger - Zingiber officinale Roscoe, - Zingiberaceae.*

It is said to be *Maha-Aushadh* in Ayurveda. Due to its *Aam-Pachak* properties, it strengthens the digestive tract and in turn stimulates the immunity.

k) *Cinnamon - Cinnamomum verum - Laurels*

It has anti-viral properties. Immunomodulatory function. Best for respiratory disorders. Regulates the immune system. Rich source of Vitamin A, C, E, Iron and Zinc.

l) *Laung / Clove - Syzygium aromaticum - Myrtle family*

High in antioxidants. Has antimicrobial and antibacterial properties. Improves liver function, reduced inflammation. Ayurveda mentions it to be best in *Kasa*, *Shwasa* conditions.

m) *Garlic - Allium sativum - Solanaceae*

It is a good source of Vitamin C, Manganese, Vitamin B6 and fibre. It also contains Ca, Potassium, Phosphorus and iron in little quantity. Prevent and reduce the severity of common illnesses like the flu and common cold. Improve blood pressure for those with known high blood pressure

n) *Munakka - Rich source of Ca, Iron.*

Enhances *Bala* (strength), immunity. Its anti-viral functions are well known. It also maintains blood pressure levels by increasing nitric oxide in the blood

and helps to widen narrowed blood vessels thereby improving blood flow. Useful for managing constipation due to its laxative property.

- o) Usage of Ginger, Turmeric, Long pepper, Clove, Garlic, Cumin, Coriander, Cinnamon, Basil leaves (*Tulsi*) in excess either along with food or alone.
- p) *Ushna Jalapana* (Frequent intake of hot water) can be added with Mint leaves and Coriander leaves, Fennel, Ajwain.

Aushada

Bhaya-Urdhwagata Shodana

- a) *Nasya* - Since the pathway of disease is upper respiratory track, *Nasya* can be beneficial to combat the disease and to keep the channel clear for breathing. Medicated Nasal drops can be instilled into both the nostrils every day and night.
- b) *Kavala Graham* - Keeping the medicated oil or *Kashaya* (decoction) in the mouth for some time until the eyes starts watering. This keeps the oral cavity clean, strengthens the gums, and clears the mucus plugs if adhered in the channel.
- c) *Gandusha* - Gargling which helps to clear the sinuses and keeps the channel patent.
- d) *Swedana* - Sudation can be done by frequent inhalation of steam with addition of bronchodilating drugs like *Vasa* (*Adathoda vasica*), *Bharangi* (*Clerodendrum serratum*) depending on *Roga* and *Rogi Bala*. This procedure helps to clear the airways and aids smooth respiration.
- e) *Dhupana* - Fumigation can be done by using drugs like *Guggulu* (*Commiphora mukul*), *Nimba* (*Azadirachta indica*), *Vacha* (*Acorus calamus*). The efficiency and mode of action of *Dhoojana* drugs are documented by Shrestha et al. in their work. *Dhoojana Karma: A review through Brihatrayi*.^[24]

Ayurveda - As Preventive Medicine

Ayurveda mentioned *Dinacharya* (~daily regimen), *Ritucharya* (~seasonal regimen to maintain healthy life), *Sadvrita* (~good moral conduct), *Rasayana*

(~antioxidants), *Vyayama* (~exercise), *Swarna Prashana* etc. as preventive medicine.

Dinacharya as preventive measure for COVID 19

If one follows *Dinacharya* regularly, then it brings beneficial effects on proper functioning of the body thereby maintaining a state of equilibrium of *Tridosha*, *Sapta-Dhatu* (tissues) and *Tri-Mala*. It also improves the power of digestion. Helps in attainment of a pleasant state of mind, soul and sense organs. It maintains a good health which is required to achieve a long life.

- *Brahmamuhurta* - i.e. wake up in early morning which keeps the person active and alert. Exposure of bright light in early morning helps in the release of serotonin (neurotransmitter biochemically derived from tryptophan) which creates the feelings of well-being and happiness.^[25]
- *Dantadhavana* (~tooth brushing) - It stimulates taste perception and increases the salivation. Saliva contains lysozyme and secretory IgA which act as antimicrobial agents.

Earlier used methods for *Danta-Dhavan* includes Neem sticks which are antibacterial, antiviral, antiparasitic, antiinflammatory, anticarcinogenic, antioxidant, immune upregulation.^[26]

- Anjana (~collyrium in eyes)- It causes irritation to eyelids and conjunctiva and enhances the circulation..Improves vision and clarity.
- *Vyayama* (~exercise) It increases O₂ supply to remote tissues. The perspiration takes out the accumulated toxins from the body. As per Ayurveda, *Viruddha-Ahara* (incompatible food) does not affect one who practices exercise daily.
- Yoga Exercise and meditation, daily practice of *Yogasana*, *Pranayama* for at least 30 minutes. Maintains a balanced metabolism. Increased flexibility. Increased muscle strength and tone. Weight reduction. Cardio and circulatory health

Pranayam

- *Kapalbhati* is one of the most popular types of *Pranayam* where in a person takes a long breath and then exhales in short, intermittent bursts.

- Alternate nostril (*Anuloma Viloma*) breathing is another easy exercise.
- Important *Yoga* and *Pranayam* during COVID;
- *Ujjayi* breathing where in you take a long breath first filling up your stomach and then the chest.
 - While one inhale, the stomach is the first to go in followed by the chest.
 - This facilitates maximum oxygen retention by the body.
 - Breathing retention is another type of *Pranayam* that helps strengthen lung capacity.
 - Inhale a deep breath and hold for as long as you can, this ensures greater oxygen supply and absorption.
- *Snana* (Bath)
 - Daily bath improves enthusiasm, strength, appetite.
 - It removes sweat and other impurities from the body.^[27]
- **Graha-Dhupana:** *Dhupana* - (fumigation) of the house every evening with antimicrobials such as Neem leaf, *Sarshapa* (*Brassica campestris* L), Loban (gum bezamin/benzoin - *Styrax bezoin* Dry and), *Karpura* (*Cinnamomum camphora* (L) J.Presl.), Ghee etc. Also usage of *Aparajita Dhooma Choorna* (A.H.Jwara *Chikitsa*) as per availability can be adopted.

Panchkarma

Panchkarma include 5 detoxification processes, used to treat diseases as well as to maintain health.

1. *Vaman* (Medicated emesis),
2. *Virechan* (Medicated purgation),
3. *Basti* (Medicated enema),
4. *Nasya* (medication through the route of nose),
5. *Raktamokshan* (Blood letting)

The *Panchkarma* therapy minimizes the chances of recurrence of the diseases and promotes positive

health by rejuvenating body tissues and bio-purification.

Panchakarma as preventive measure

The preventive aspect *Panchakarma* may be applied as part of *Dinacharya*, *Ritucharya* and in the management of *Vegavadharana Janya Roga*. *Abhyanga*, *Snehana*, *Nasya (Pratimarsha)*, *Matra Basti*, *Karna Poorana* etc. may be included in *Dincharya* according to specific seasons.

Ritushodhana

The major part of preventive aspect of *Panchakarma* is *Ritushodhana*.

Ritu Shodhan i.e Regular detoxification of body

Panchkarma according to Ritu

- Vasanta - Chaitra : Vamana should be done
- Sharada - Kartik : Virechana should be done
- Sharada - Kartik : Raktamokshana is best
- Pravrut - Shravan : Basti is indicated

Utility of Rasayana therapy

In Ayurveda, mentioned *Rasayana* which act as immunomodulators. The word *Rasayana* is made up of two separate words *Rasa* and *Ayanam*. Although there are different meanings of *Rasa* in Ayurveda but in context of *Rasayana* it means the essence of the end product of digestion which is called *Rasa Dhatu* (mostly correlated to plasma or lymphatic fluids or circulating fluids) and "*Ayanam*" means path or channels by which *Rasa* reaches the targeted body tissues. Thus, *Rasayana* facilitates assimilation and circulation of *Rasa Dhatu* which is responsible for nourishing *Uttarottar* (succeeding) *Dhatu*. As *Ojas* is *Saara* (end essence) of all seven *Dhatu's* present inside the body, it is responsible for providing immunity and resistance against diseases. Its production, maintenance, storage, utilization and proper circulation inside body must be consistent and proportionate.

Rasayana is defined as the means through which one attains highest quality of *Rasa* and other *Dhatu* is called as *Rasayana*.^[28] To achieve preventive,

promotive and curative aspects of health, the *Rasayana* is classified based on method, purpose at which the *Rasayana* therapy is carried out. Based on place and method of its use *Rasayana*, it is classified into two categories by Acharya Charak - first *Vata-Atapika* and second *Kutipravesika*.^[29] Again it is classified as *Kamyas*, *Ajasrika* and *Naimittika Rasayana*. Here, for *Vata-Atapika* there is no requirement of special place and no restrictions from day to day activities to use this form of *Rasayana*. In this type, the exposure to outside environment is allowed and any person can follow it. For example, "*Chyavanaprasha*" is used as a *Rasayana* for children or adult daily once or twice to improve immunity and strength. In *Kutipravesika Rasayana*, a three segmented room (*Trigarbha-Kuti*) is the place where three walled huts are made specifically for this purpose. There is no influence of heat and light in this closed and conditioned dark room. This type is comparatively more effective than *Vata-Atapika Rasayana* method but is difficult to perform and supervision of physician is necessary for this method of *Rasayana*. Meaning of *Kamyas* is to achieve some specific desire or purpose. As suggested by the name *Kamyas Rasayana* is used for different purposes like for improving longevity (*Ayushya*) or enhance brain function (*Medhya*), to slow down the ageing process (*Vayasthapana*), to improve the function of body tissues (*Dhatu* and its channels) and improving sensory functions. This is more towards promotive aspect of health. *Ajasrika* where we can be used regularly for improving general health and immunity of individuals, for example use of milk, Ghee or any potential medicines to keep the person healthy and defend against various ailments. In this way the *Rasayana* under *Kamyas* and *Ajasrika* can be very useful towards promotive and preventive aspect of health. These are very potential in increasing *Ojas* or *Bala* of individuals and thus helpful in combating pandemic like COVID-19.

Naimittika Rasayana is used for treatment of diseases by using specific formulations. This is definitely the curative aspect of *Rasayana Chikitsa*. For example, use of *Agastya Rasayana* in chronic respiratory

disorders is a *Naimittika* type of *Rasayana*. *Acharya Charaka* in *Chikitsa Sthana Rasayanadhyaya-Abhyamlakiyam Rasayanapadam* explained importance and benefits of *Rasayana* therapy. *Rasayana* and *Vajeekarana* both the therapies are capable of preventing as well as curing diseases. Both therapies promote health by their *Ojas Karma* (increases strength and immunity) and *Vrishya* (improves fertility) effects.^[30] Benefits of *Rasayana* which gives longevity, strong memory and retention power, attaining good health, youthfulness, lustre, enhanced complexion and voice. *Rasayana* provides strength to the body and sense organs and skin gets glowing with health.^[31] Natural strength and immunity present from birth is known as *Sahaja-Bala*, and the strength or immunity of a person according to the influence of season, age time etc is referred as *Kalaja-Bala*. The strength that is achieved by *Yukti* or wisdom, through logical selection of appropriate food, sleep, control of sexual urges and use of *Rasayana* is known as "*Yuktikrita-Bala*". Thus, *Rasayana* can play a vital role in achieving *Yuktikrita-Bala* and thus improving strength and immunity of the body. Also *Swarnaprashan* and *Prakarayogas* are special recipes described for immunomodulation.

Swarna Prashana (administration of gold)^[32]: Gold is indicated for internal use even before conception so as to be get a healthy baby. After birth in *Lehana* (supplementary feeds) and *Jatakarma Samskara*, gold has been said to have a major role to play. As the child grows, gold is also being recommended to be given alone or along with various herbal drugs for improving *Agni* (digestive power and metabolism), *Bala* (physical strength and immunity), *Medha* (intellect), *Varna* (color and complexion), *Ayu* (lifespan) etc. Study has also reported that gold nanoparticles actively inhibited Measles Virus infection in vero cells at 50% effective concentration likely by blocking viral particles directly, showing potent virucidal effect. As per a study, nano-material has been shown to activate the complement system through several different pathways leading to particle opsonization and clearance.^[33]

Prakara Yoga: It is a chapter in one of the prime traditional Ayurvedic pediatric text book *Arogyakalpadruma*. The whole content of *Prakara Yoga* chapter deals with different immuno-modulatory recipes and procedures to be adopted right from the day after delivery^[34] For eg: *Jaatamatra*/one day old child: *Vacha* (Rhizome of *Acorus calamus* L.) is grinded in the juice of *Tripadika* (*Desmodium triflorum* (L.) DC) and three drop of this mixture is instilled over the centre of the head. This procedure will maintain the digestive power correctly, the *Doshas* will maintain correct balance, and the affliction with *Balagraha* (certain infectious diseases of childhood) will be prevented. Also other Factors like Role of *Ahara* (food): Consumption of proper, amount of food brings strength, complexion, happiness and longevity. In the *Agryaoushadha* (best medicines) context, meat of cock is described as the best for strength promotion, Gooseberry fruit and habitual use of ghee and milk for rejuvenation of body. Food with all required nutrition in adequate quantity helps in preservation and promotion of health gives strength, vitality, endurance and improves immunity.

Some of the important drugs mentioned in Ayurveda as a *Rasayana* which helps to boost immunity.

- **Yashtimadhu** - It mention as *Rasayana* in Ayurvedic texts. *Glycyrrhiza glabra* or Liquorice which contain glycyrrhizin, glycyrrhizic acid, glycyrrhetic acid and glabrine etc. as major chemical constituents. It has anti-inflammatory, antipyretic and antioxidant properties.^[35]
- **Guduchi/Amrita** - *Tinospora cordifolia* - *Acharya Charaka* described under *Medhya Rasayana*. It contain chemical constituents tinosporin, tinosporide and cordifolide. It has antioxidant, phagocytic activities, antipyretic action as well as immunomodulatory properties.^[36]
- **Ashwagandha** - *Withania somnifera* or Indian ginseng contain withaferin A, withanone, withasomnine as major chemical constituents. It has established anti-inflammatory,

antidepressant, antioxidant and immunomodulatory activities.^[37]

- **Amalaki** - *Embllica officinalis* or Indian gooseberry rich source of Vitamin-C. It contains low molecular weight hydrolysable tannins. It also contain ellagic acid, linolic acid etc. as chemical constituents showing activities against carcinogenesis, it also shows cytoprotective, anti-inflammatory, anti microbial, antioxidant and immunomodulator activities.^[38]
- **Vibhitaki** - *Terminalia bellerica* - Bahed contain chebulagic acid, ellagic acid, gallic acid, mannitol as major chemical constituents. It has antispasmodic, antihistaminic, antibacterial, antiviral and antioxidant property.^[39]
- **Haritaki** - *Terminalia chebula* - Harad contain chebulinic acid, anthraquinone, arachidic acid etc. as major chemical constituents. In Ayurvedic classics, Haritaki mentioned as *Rasayana*, Tridoshahara indicated for Swasa and Kasa. It has established antibacterial, antispasmodic, antioxidant and immunomodulatory activities.^[40]
- **Pippali** - Piper longum or Long pepper which contain piperine, pipartine, pellitorine, caryophyllene etc. as major chemical constituents. In Atharvaveda, Pippaliis mentioned as *Rasayana*. Acharya Charaka and Susruta also mention Pippali as *Rasayana*. It has anti-inflammatory, antispasmodic and immunomodulatory properties.^[41]
- **Chayavanprash** - Its main content is *Amla* which is a rich source of vitamin C. It is natural immunity enhancer and very good in boosting the functions of respiratory system. It is a proven fact that it has immune modulatory functions.

Sadvritta - Social Rules

Sadvritta include - one should offer oblation to the fire (perform *Yagya*), one should clean excretory passages and feet frequently, one should not consume food without washing hands, feet and face or without cleaning the mouth. Similarly, one should not indulge in yawning, sneezing or laughter without

covering his mouth. The idea behind consuming food after proper cleaning of hands, feet, face and covering the face on sneezing, yawning, laughter etc. can be correlated with the current practice to avoid the spread of infectious viral diseases like COVID-19.

Guidelines for Ayurveda practitioners for Covid-19

Immunity enhancers

A) Single Drugs

- **Guduchi** - Consuming 500 to 1000 mg of aqueous extract of *Guduchi* (*Tinospora cordifolia* Thunb. Miers)
- **Amla** - Consumption of fresh *Amla* fruit (Indian gooseberry - *Embllica officinalis* L/ *Phyllanthus emblica* L) or *Amla* candy is also advisable.
- **Haridra** - Gargling with warm water added with turmeric powder (*Curcuma longa* L) and a pinch of salt or Turmeric (*Curcuma longa* L)
- **Tulasi** - Frequent sipping of water processed with *Tulsi* (basil leaves - *Ocimum tenuiflorum* L Merr (synonym *Ocimum sanctum* L) is advised.

B) Immunity Enhancers – Formulations

- Chyawanprash Avaleha - 10 - 12 gm / 1 Spoon
- Drakshavaleha - 10 - 12 gm / 1 Spoon
- Indukantam Grutham - 10 - 12 gm twice daily before food, when hungry
- Aravindasava - 15 - 20 ml with equal quantity of warm water after food
- Balachaturbhadra Churna - 1 - 2 gm with honey
- Haridra Khanda - 3 - 5 gm intermittently with honey/ warm water.

AYUSH 64

Recently, AYUSH has recommended AYUSH 64 tablet to combat Covid-19.

Ayush-64 was developed and patented by CCRAS in India around 38 years ago. It is a combination of 4 Ayurvedic products: *Alstonia scholaris* (aqueous bark extract), *Picrorhiza kurroa* (aqueous rhizome extract),

Swertia chirata (aqueous extract of whole plant) and *Caesalpinia crista* (fine-powdered seed pulp).

Dose - 2 Tablets (500 mg) thrice daily (2-2-2).

Dosage form - Tablet

Route of Administration - Oral

Time of Administration - Thrice a day after food

Anupana - Warm water

Duration of therapy - 14 days

Therapeutic intervention in COVID-19

Lakshanas/ Symptoms	Drug/Aushadi	Matra/ Dose	Anupana / vehicle
Fever (Jwara)	1) Mahasudarshana Ghana Vati	500mg TDS	Lukewar m water
	2) Amritarista	15-20ml TDS	Lukewar m water
Sore throat	1) Vyoshadi Vati/ Lavangadi Vati/ Khadiradi Vati	2 tab TDS	Lukewar m water
	2) Laxmivilasa Rasa	125 mg tid	Tambool a Swarasa
Nasal congestion (Pratishyaya)	1) Haridra Khanda	3 - 5 gm BD	Lukewar m water/ milk
	2) Laxmivilasa Rasa	125 - 250 mg	Tambool a Swarasa
Cough (Vataja Kasa)	1) Talisadi Churna(4 g)+ Madhuyashti Churna (2 g)	Combination BD	Honey/ lukewar m water
	2) Sitopaladi Churna	3-6 gm with honey BD/TDS/as required	Honey
	3) Tankana Bhasma	250 - 500 mg BD	Lukewar m water
Immunocomp	1) Samshamani Vati	500 mg	Lukewar

romised conditions - Reduced Vyadhiksham atwa		tablet, 2 tablet BD	m water
2)	Agastya Haritaki Rasayana	10 -12 gm BD	Lukewar m water
3)	Chayavanaprasha valeha	10 -12 gm BD	Lukewar m water
4)	Bramha Rasayana	10 -12 gm BD .	Lukewar m water

DISCUSSION

In current situation, Covid 19 declared as Pandemic. This pandemic of Corona virus disease SARS COV2 has no treatment and vaccination available till now. If peoples are not aware and not following proper guidelines then it becomes disasters. Only prevention is the way by adoption of social distancing as the contaminating rate is very high. Only good immunity can protect human from getting infected by microorganisms to some extent. So one should understand the importance of healthy life style, good diet habits and daily exercise etc. to acquire immunity. Immunity can be acquired with some herbs and medicines, by following regimen, Proper *Rasayana* etc. Immunity means strength of protecting from infectious diseases. It protects the body from invading pathological microorganisms and malignant diseases. When etiological factor comes in contact with the body, tries to produce the disease. But at the same time body also tries to resist the disease. This power of body which resists the development of disease or resists a developed disease is called immunity. It is observed that certain persons do not develop a disease even after coming into contact with the relevant etiological factor while at the same time others get victimized by the same microorganism or the disease at the same time in same environment or climate. Hence, when resistance power of the body is sufficiently stronger it destroys the causes. And this resistance power can be acquired by immunity which may be inherate or acquired. Whenever Imbalance of *Tridoshas* i.e. *Vata*, *Pitta*, *Kapha* and consequent impact on the body components (*Dushyas*, *Dhatus* and *Malas*) are responsible for disease. So, balanced *Tridoshas*, balanced Agni, excellence of all *Dhatus* and

normal functioning of all *Strotasas*, along with the body strength (*Bala*) contributes to the immunity of the body. According to Charaka, *Shleshma* is strength of body. It is *Prakrit Kapha* in the body. Good quality of *Prakrit Shleshma* in the body signifies the good quality of *Ojus* and indicates good body immunity. *Ojus* is the essence of *Saptadhatu* and is the seat for strength. *Ojus* has important and significant role in the context of *Vyadhikshamatva*. It is stated that deficiency of *Ojus* in the body causes wasting, decay, degeneration and destruction. *Bala* is also used as synonyms of *Ojus*. *Ojus* may be considered as secretion of endocrine glands. When *Ojus* is in good quality and quantity the strength of the body and its immunity for fighting against the disease is at its best. In this way, by following the lifestyle and guidelines given in ancient Ayurvedic literature, one can develop *Vyadhikshamatva*. A healthy lifestyle involves eating nutritious food, practicing hygienic habits, walking and exercising regularly, maintaining good emotional and mental health and having adequate sleep. Rational use of food is primary for immunomodulation. Daily and seasonal regimen along with use of specific medicines like *Rasayanas* triggers immunomodulation.

CONCLUSION

COVID-19 is a pandemic which has affected human living enormously now. Even the most developed countries of the world like United States is not able to keep the dreadful situation under control. Covid 19 disease is considered as *Janapadodhwamsaneeya Vikara* in Ayurveda. Still there is no medication available. But Ayurvedic system, which is a holistic system of medicine has many effective time tested medicines like Sudarshanam tablet, Sanshamani Vati etc, *Panchakarma* procedures and techniques like dietary and lifestyle modification for immunomodulation. Hence, with the help of concepts of Ayurveda where our ancient *Acharyas* already described various immunity booster medication and therapies like *Panchakarma* procedures, *Rasayana*, *Satmya* and *Yuktikrita Bala*, *Ojas*, *Yoga*, *Pranayama* etc. By which should achieved good immunity and

should face any infectious diseases which is also helpful in current pandemic i.e. Covid 19.

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