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Approach of Ayurveda in Post COVID Management

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Abstract---COVID-19 is a respiratory illness global epidemic caused by “Severe Acute Respiratory Syndrome Coronavirus 2”. Acute post COVID syndrome lasts longer than 3 weeks after the main infection, whereas chronic post COVID syndrome lasts longer than 3 weeks after the main infection. Fatigue, dyspnea, low-grade fever, cough, tastelessness, anosmia, chest pain, myalgia, and sleep and mental disturbances are common post-COVID manifestations. The cause of post-COVID syndrome is not well understood. According to Ayurveda concepts, the symptoms of COVID-19 are similar to Vatakapha pradhan Sannipataj Jwara and there will be *Dhatu-Kshaya & Agnimandya Avastha* in Post-COVID 19 infection. Hence in this condition agnideepana, amapachana, brimhana and rasayana chikitsa is indicated. A Post-COVID management strategy has been issued by the MHFW's Directorate General of Health Services (EMR Division) that include Ayush Kwath, Samshamani vati or Giloy powder, Ashwagandha vati or Ashwagandha powder, Amla fruit or Amla powder, Mulethi powder, Warm Milk with Haldi, Gargling with turmeric and salt, Chyawanprash and daily practice of Yogasana, Pranayama and Meditation. Many research evidences proved that all these drugs possess anti-inflammatory, antistress, antioxidant and immunomodulatory properties which help in management of post COVID syndrome. From this review it can be concluded that Post COVID syndrome can be effectively managed by adopting Ayurveda modalities and there is a need to conduct more research studies on it to prove efficacy of Ayurveda therapy in the management of Post COVID Syndrome.

Keywords---Ayushkwath, Post COVID syndrome, Rasayana, immunomodulatory.

Introduction

COVID-19 is a respiratory illness global epidemic caused by “Severe Acute Respiratory Syndrome Coronavirus 2”, which was noticed in Wuhan, Hubei Province, China, in 2019 following a respiratory illness outbreak [1]. COVID-19 symptoms have ranged from asymptomatic to severe sickness and death. Approximately 81 percent have a simple or light illness, 14 percent suffer a severe disease requiring oxygen therapy, and 5% require critical care unit treatment. Pyrexia, cough, dyspnea, tiredness, bodyaches, headache, running nose, sore throat, and anosmia or loss of taste are common clinical signs two days to two weeks following virus exposure [2]. COVID is transferred via droplets from infected people's mouths, eyes, or hands within a distance of 3 feet or 1 metre, and indirectly through contact with a coronavirus-infected surface. According to SARS-CoV-2 research, viruses in droplet particulates (a tiny mist) had a half-life of around an hour, but some could live for 3 hours or more. For up to 4 hours, active virus can be found on metallic surfaces, up to 24 hours on wood, and at least 72 hours on plastics and metal [3]. Although the majority of COVID-19 patients recover and return to normal health, some people may continue to have symptoms for weeks or even months after the acute illness has subsided. Subjects are non communicable to others at this time. This new clinical condition is causing alarm among healthcare personnel all around the world. Even if they are not admitted to the hospital and have a minor illness, some people develop medical complications that can have long-term health consequences. The phrase "post COVID condition" is used to describe this long-term state of deterioration in health, but other labels are also used to describe it. Unfortunately, no international agreement on what constitutes a post-COVID condition has yet been established. The chronic combination of symptoms is known as postCOVID disorders or syndrome, as per National Institute for Health and Care Excellence (NICE). Acute post-COVID syndrome lasts for more than three weeks after the original infection, whereas chronic post-COVID syndrome lasts for more than three weeks after the main infection [4, 5]. Greenhalgh et al. first defined it as COVID-19-associated sickness that lasts longer than 3 weeks after the onset and chronic COVID-19 if the symptoms last longer than 12 weeks after the onset of symptoms. The rate of occurrence varies between 10% and 35%. [6,7]. It's estimated that up to 20% of SARS-CoV-2 infected people will develop post-COVID syndrome. [8]. Post-COVID signs and symptoms include fatigue, dyspnea, low-grade fever, cough, tastelessness, anosmia, chest discomfort, myalgia, and sleep and mental problems.

Symptoms can be divided into two categories: common and uncommon. Fatigue, breathlessness, arthralgia, chest discomfort, cough, and changes in sense of smell or taste are common symptoms whereas sleeplessness, low-grade fevers, headaches, cognitive difficulties, myalgia and weakness, disorders related to GI and depression are less common ones. [9]. Depending on the severity of the acute infection and the time of observation, the frequency of distinct symptoms varies. The most prevalent post-COVID symptom is fatigue, affecting 17.5 percent to 72 percent of hospitalized patients. It can last for up to seven months after an illness begins, producing considerable damage. Dyspnea and reduced exercise tolerance were found in 10–40% of COVID-19 hospitalized patients for 2–4 months after discharge, while 65.6 percent of patients confined to the intensive care unit

experienced new or worsening dyspnea. COVID- Two months following release from the hospital, 19 patients experienced chest pain in up to 22% of cases and gastrointestinal difficulties in up to 30% of cases. Sense of smell and taste impairment can remain for more than a month, upto 11% and 9% of patients six months after discharge, correspondingly, and upto to 7% and 3.7 percent of cases eight months after moderate COVID-19, respectively, were affected. Acute COVID-19 has also been associated to heart arrhythmias and elevated blood pressure that persists. Sleep and mental difficulties like nervousness and anxiety may affect roughly 26% and 40% of patients 6 months after receiving COVID-19, respectively. [10]

The World Health Organization (WHO) has designed a post-COVID case report form (CRF) to collect standardized clinical data from persons following hospital discharge or acute sickness in order to investigate the medium and long-standing effect of illness. Obesity, respiratory disorders like asthma, the presence of symptoms (e.g. cough, fatigue, headache, diarrhoea, loss of smell) above five in number in the first week after COVID-19, and women are all risk factors for post COVID.

The exact cause of this syndrome is unknown. As per research, chronic inflammation appears to have contribution in the aetiology of this disorder. The pathogenesis is multifaceted and involves multiple systems, but persistent inflammation, as well as vascular dysfunction caused by immunity, thromboembolism, and dysfunction of nervous system, all of which are linked to the disease's origin, plays a key role. Recurrence or reinfection, inflammatory and other immunological reactions, viraemia that occurs due to a low or non-existent antibody response, deconditioning, and mental factors like post-traumatic stress may all play a role in how long some patients' recovery takes.

Methodology

Textual references and research articles on post-COVID symptoms were searched using appropriate keywords and properly studied.

Result and observations

When symptoms continue for 3 weeks or longer following the commencement of COVID-19, clinical care of post-COVID syndrome necessitates a holistic approach. The clinical evaluation began with a thorough review of the patient's medical history, from the onset of the first symptom to the current symptoms, as well as the nature and severity of those symptoms. Examine the patient's vital signs and functional state. Patients' comorbidities, such as diabetes mellitus, hypertension, kidney disease, and ischemic heart disease, should also be examined and controlled in conjunction with COVID 19. The patient should be offered social, financial, and cultural support. Patients should be handled pragmatically and symptomatically after excluding major continuing problems or comorbidities. Treatment based on symptoms is part of medical management. For example, antipyretics such as paracetamol or nonsteroidal anti-inflammatory medications can be used to treat a fever. When a cough is present but there are no signs of infection, it is best handled with easy breathing exercises. This will aid in the

normalization of breathing patterns by boosting the effectiveness of the respiratory muscles (diaphragm), as a result, there will be less energy consumption and less aggravation of the airways, less fatigue, and a reduction in dyspnea. Breathing exercises will help with the symptom of breathlessness. Pulse oximeter can be used to assess and monitor it. According to BTS recommendations, the ideal saturation of O₂ is 94-98 percent. Supplemental oxygen is required if the level is less than 92 percent. There is no research regarding medicinal or non-pharmacological therapies for effectively treating the fatigue. Based on indirect evidence, one should return to graded exercise. Cardiopulmonary complications are common in people with pre-existing cardiovascular disease. Viral invasion, inflammation and microthrombi, as well as down-regulation of ACE-2 receptors, have all been hypothesized as pathophysiology.

For Chest discomfort a careful history, a physical examination done to identify whether it is related to Cardiovascular, respiratory or /Musculoskeletal disorders to treat accordingly. If it is related to cardiac cause then urgent cardiology referral for specialist assessment and investigations is needed. In thromboembolic events higher risk patients should be given 10 days of extended thromboprophylaxis. Further evaluation and monitoring should follow normal standards for the continuation of anticoagulation. Standard protocols can be used to treat ventricular dysfunction. For three months, intense cardiovascular workout must be avoided. Ischemic stroke, seizures, encephalitis, and cranial polyneuropathy are all neurological consequences that should be referred to a neurologist. [11] Supportive therapy can be utilized for common non-specific neurological symptoms such as headache, confusion, and mental blunting (“brain fog”) until evidence-based guidelines is obtained.

WHO has issued guidance on the Post-traumatic stress disorder which include psychological health and emotional components for the general public, health professionals, child care providers, elderly adults, people in isolation, and health facility team leaders or managers which should be followed for keeping Mental health stability in mental disorders like anxiety, stress, difficulty sleeping also for uninfected people, circumstances associated to disrupted routines, loneliness, and social isolation exist.[12] As per Acharya Sushruta diseases do not occur without involvement of doshas so an intelligent physician should treat unnamed ailments based on the symptoms created by doshas. [13] Although the nomenclature of many ailments is not given in the Samhita, according to Acharya Charaka, many ailments can be treated by considering the causal factors, the doshas and dhatus, and other elements involved in their manifestation. [14,15]. As per Acharya Charak the epidemic can be considered as Janapadodhwasa vyadhi. As per Acharya Sushruta, the current COVID 19 is an Aupasargika Roga (communicable disease) that is pandemic in character. The Sankramak Roga gave rise to Janapadodhwamsa. Sankramak Rogas are contagious diseases that can be passed from one person to another either directly or indirectly. Roga can be Nija or Agantuja, according to Ayurveda. Agantuja Roga is caused by the invasion of microorganisms into the body, whereas Nija Roga is produced by internal changes in the body. Any microbial invasion will only have an impact on the body if the Bala is lowered. Reduced Bala can trigger the Sankramak Roga's pathogenesis.

When foreign agents (agents) enter the body, they first develop in the tissues, then create numerous poisons that might lead to disease [16].

According to Ayurveda concepts, the symptoms of COVID-19 are similar to Vata kapha pradhan Sannipataj Jwara and there will be *Dhatu-Kshaya* & *Agnimandya Avastha* in Post-COVID 19 infection [17]. Post COVID problems are manifestations of Vata prakopa. Vata Vyadhi can appear due to Dhatu kshaya or Avarana, according to the classics. Hence Post COVID symptoms can be correlated with Dhatu kshaya and Avarana. Dhatu kshaya occurs as a result of inappropriate chaya upchaya in chronic sannipataj jwara, and all Sapta Dhatus are lost to some extent. Finally, dhatu kshaya causes a decrease of immunity (Ojakshaya). When Dhatvagni decreases, the formation of the successive Dhatu may be hampered. Agnimandya also leads to Ama (undigested and improperly formed food) formation which causes srotoavrodh. In COVID-19 there is obstruction in the pranavahasrotas, causing vitiation of Kapha-Vatadosha, which, in turn, disrupts the normal physiology of breathing.

There is currently scant research on post-COVID sequelae, for which more research needed to explore evidences. All post-COVID recovering patients require a comprehensive strategy to well-being and follow-up treatment as no specific treatment is given for it. In such a scenario Ayurveda has a greater role in preventing progression and reducing symptoms by adopting its holistic approach. For correction of dhatukshaya and agnimandya, dhatuposhana, balya and brimhan, deepana, pachana, rasayana chikitsa, pathya aahar, yoga, pranayama and meditation can be used. The MHFW's Directorate General of Health Services (EMR Division) has issued a Post-COVID management policy that include daily consumption of immunity-enhancing AYUSH medicines such as "Ayush Kadha" in dose of 150 ml every day, "Samshamani vati" two times a day 500 mg or Gulvel churna 1 -3 grams with lukewarm water for 15 days, "Ashwagandha" 500 mg twice a day (1 gm per day) or "Ashwagandha churna" 1-3 grams twice daily for 15 days and "Amalaki fruit" one daily/Amalaki churna 1-3 grams once daily. "Yashtimadhu churna" (for dry cough) 1- 3 gram with lukewarm water twice daily, Warm Milk with ½ teaspoonful Haldi in twice in the morning and evening. Gargling with Haridra and saindhav, "Chyawanprash" 1 teaspoonful (5 mg) once daily in morning. Daily practice of "Yogasana, Pranayama and Meditation", should be advised as much as health permits or breathing exercises as prescribed by treating physicians [18].

Discussion

The constituents of Ayush Kadha (herbal decoction) are Tulsi (*Ocimum sanctum*), Dalchini (*Cinnamomum verum*), Shunthi (*Zingiber officinalae*), and Kali Mirch (*Piper nigrum*). As per taste, lime or Jaggery can be added. Kadha is an excellent medicine for common cold, sore throat, cough, runny nose, fever, and other ailments. It aids the body's defensive mechanism by combating infection causing bacteria. It helps in indigestion, loss of appetite, stomach irritation, flatulence, constipation, and other digestive difficulties. The ingredients used in preparation of kadha possess tikta katu rasa, ushnavirya, tridoshahar, deepana, pachana, Yakriduttejak and rasayana properties. As per phytochemical studies conducted on these drugs it proved their antioxidant, antiviral and immuno modulatory

properties. Thus it helps to correct deranged Agni and also removes Strotorodha; this helps in proper digestion and production of dhatu and thus promotes Ojavardhana. Oja enhances immune function and helps in reducing symptoms [19].

The Main Ingredient of Samshamani vati is Guduchi (*Tinospora cordifolia*). It is recommended in doses of 500mg twice a day. It is beneficial as an immune modulator and prevents occurrence of communicable diseases. Research studies proved its efficacy in viral fevers, as anti-inflammatory, antipyretic & immunomodulatory. In comparison to Favipiravir, Lopinavir/Ritonavir, and Remdesivir, it has a high binding efficacy against SARS-CoV-2 sites implicated in virus attachment and replication, according to three in-silico investigations. About 7 studies are being conducted on Guduchi as prophylactic care on about 1.33 lakh people under the Ministry of AYUSH, with excellent outcomes in avoiding COVID 19 and managing asymptomatic COVID 19 without any side effects. [20-23]

Ashwagandha (*Withania somnifera* Linn.) is a *Vatakaphashamaka*. Ashwagandha is a well known Rasayan (rejuvenator) drug indicated in Shwas (dyspnea) and Kasa (cough). Molecular modeling methods revealed that withaferin A and withanone found in Ashwagandha could bind and interact stably at TMPRSS2's catalytic region. Withanone is also able to induce changes in the allosteric site of TMPRSS2. Withanone inhibits the entry of SARS CoV 2 into the host cell by blocking TMPRSS2 and possesses immunomodulatory, anti-stress, and antiviral effects. In-silico investigations have revealed that it has a high binding affinity for the ACE2-RBD interface, which could prevent SARS COV 2 from infecting cells [24]. Prolonged social isolation has also been linked to increased stress and anxiety. It has a high level of pulmonary protection. There are numerous studies on Ashwagandha that have been published in reputable peer-reviewed publications to prove its efficacy, safety, and preventive action. [25].

The rhizome of Haridra (*Curcuma longa* Linn.) has Kapha and Vatashamak and pitta balancing property. It has Shothanashak (anti-inflammatory), Vishanashak (eliminates toxins) and Peenasanashaka (against coryza) properties. [26]. Curcumin [27] is the major phytochemical found in Haridra. Curcumin has anti-inflammatory, anti-oxidant, gastroprotective, and hepatoprotective properties [28]. Curcumin has been proven in numerous preclinical investigations to limit viral infection, control cytokine storm, and hence prevent severe lung injury and fibrosis [29].

Guduchi (*Tinospora cordifolia* Willd.) balances the *Tridosha* and is a *Rasayan* (rejuvenator) medicine. *Guduchi*, according to Ayurveda, is Jwarhara (antipyretic) and prevents Shwas (dyspnea) and Kasa (cold) (cough) [30]. *Tinospora cordifolia* has been demonstrated to be effective in reducing SARS CoV 2 viral attachment to host cells as well as virus reproduction. Tinocordiside and isocolumbin have proved to be effective in inhibiting SARS CoV 2 infection and replication in host cells. [31].

Aamalaki (*Emblica officinalis* Gaertn.) is a *Rasayana* (rejuvenator) herb that helps to regulate the *Tridosha*. It's a good source of vitamin C and can help you strengthen your immunity if you eat it on a regular basis. It aids in the prevention

of colds and coughs. It has an antipyretic effect [33]. *Embllica officinalis* phytochemicals such as anthocyanins, flavonoids, ellagic acid, and gallic acid have a variety of biological actions including anti-oxidant, anti-inflammatory, and immunomodulatory properties [34].

Chyawanprash is a nutrient-dense polyherbal formulation and health supplement that contains a variety of nutrient-dense herbs and minerals. Chyawanprash is an Awaleha made from Amla (*Phyllanthus Emblica*) is a Rasayana that is high in vitamin C, has a lot of antioxidant properties, and can help to enhance the immunity if taken it every day. It's used to treat conditions like asthma, TB, allergic bronchitis, the common cold, and cough [35]. Chyawanprash's immunoprotective action at the cellular level, mediated by immunological activation, immune cells such as dendritic cells, macrophages, and natural killer cells have been shown to have this property. Because of its potential to scavenge free radicals, it possesses antimicrobial, antiviral, anti-inflammatory, anti-allergic, and antithrombotic actions. [36]. Chyawanprash therapy dramatically improved NK cell activity. After treating dendritic cells, there was a significant increase in immunity marker levels as well as phagocytic activity with Chyawanprash, demonstrating its immunomodulatory effect [37]. Vamana, virechana, basti, and nasya are panchakarma chikitsa that aid in the renewal of the body, the expulsion of toxic waste, the strengthening of body muscles and regaining lost strength, the reduction of muscle weariness, and the relief of muscle aches, joint pain, and headache. It also aids amapachana in rectifying agni and strotorodha. It strengthens all of the body's organs and helps to relax the mind by lowering worry and stress and inducing restful sleep. When applied frequently, a daily nasal application of two drops of sesame oil or coconut oil, Ghee, or anuteil in both nostrils (Pratimarsh Nasya) can operate as a preventative layer from virus entry and reproduction, similar to a biomask. For foreign bodies or germs inside the nostrils or nasal cavity, anu taila acts as a physical and physiological barrier. Steam inhalation using fresh Pudina (Mint) leaves or Ajwain (Caraway seeds) and water should be done once every day. It's especially important in cough or a sore throat.

Regular practicing "Yogasana, Pranayama, and Meditation", as well as breathing exercises, should be prescribed as much as the person's health allows. It improves muco-ciliary clearance and decreases tension and anxiety, which helps to improve pulmonary function and lung capacity. Guduchi and Pippali decoction is used for different respiratory disorders and is mentioned in Vata Kaphaja Sannipatik Jvara with symptoms similar to COVID-19. The herbs' safety, immunomodulatory, antipyretic, antiviral, and anti-inflammatory qualities have all been demonstrated via extensive research on both the herbs and their phytoconstituents. In-silico experiments on both herbs revealed a strong affinity for SARS-COV 2 probable targets (COVID 19 causing virus). According to the findings of a clinical trial conducted by Kataria S et al., the Adjuvant formulation of Guduchi (*Tinospora cordifolia* Linn.) and Pippali (*Piper longum*) shortened hospital stay and enhanced recovery time. The group treated with adjuvant Ayurveda formulation had a greater overall sense of well-being and activity levels during the three-month follow-up after discharge. [38]. In post COVID, a well-balanced and healthy diet is recommended. Ayurveda advocated Shadrasayukta, laghu ahar which is brimhana in nature [39]. Use of rasayan therapy by various

rasayana drugs like *Guduchi (Tinospora cordifolia)*, *Ashwagandha (Withania somnifera)*, *Haridra (Curcuma longa)*, *Amalaki (Emblica officinalis)*, *Shatavari (Asparagus racemosus)* and *Draksha (Vitis vinifera)* help in boosting immunity and rejuvenating the body.[40]

Following measures at the individual level are recommended in the post-COVID management protocol: regular household work to be done if health permits, professional work to be resumed in a graded manner, mild/moderate exercise such as regular morning or evening walks, regular practice of *Yogasana*, *Pranayama*, and *Meditation* to be restarted gradually in a graded manner, mild/moderate exercise such as every day morning or evening walks, daily practice of *Yogasana*, *Pranayama*, and *Meditation* to be resumed in a graded manner. It is recommended to do breathing exercises and eat a well-balanced, nutritious, and freshly cooked meal. It's also a good for health to get enough sleep and rest. Tobacco and alcohol intake should be avoided. Self-monitoring of temperature, blood pressure, blood sugar, and pulse oximetry for oxygen saturation should be used in conjunction with frequent COVID and comorbidity drugs, if any are present. At the community level, several steps should be implemented. In order to raise awareness, people who have recovered should share their relatives and friends about their good experiences. Following the COVID, people can access recovery process and rehabilitation (medical, social, occupational, and livelihood) from community-based self-help groups, civil society organisations, and competent specialists. The initial follow-up appointment after COVID should be within 7 days of discharge, and future therapy and follow-up visits should be within 30 days. Polytherapy should be avoided since it has the potential to cause Serious Adverse Events (SAE) or Adverse Effects (AE). Patients in home isolation who are still experiencing symptoms should go to the nearest health facility. In severe circumstances, critical care assistance is required. Gupta K and Singhal A. conducted a clinical Study in which Post COVID symptoms were managed by using two Rasayan formulations with *Pranayam*. In this study one group was treated with *Ashwagandha Pak* and *Pranayam* and another group was treated with *Vardhman Pippali Rasayan* and *Pranayam* for 19 days. In this study, pre Diagnosed patients of post COVID syndrome having Neurologic, Psychiatric, Muscular, Respiratory & cardiac and GIT symptoms between the age group 20 to 50 years were included. They assessed the patients on the basis of comparison of scores recorded before and after treatment. They found complete improvement in 50% patients, moderate improvement in 35.2% patients and mild improvement in 11.76% of patients. They stated that *Rasayana dravyas* have tissue and disease specific immune-modulatory activity. *Rasayana* play a role in immunity and have anti-stress, inotropic and antioxidant activity which helps in increasing and maintaining quality-of-life. *Ashwagandha* is a *rasayana*, and has numerous pharmacological actions such as anti-stress, neuro protective, antitumor, anti-arthritis, analgesic and anti-inflammatory etc. *Pippali* has *Agnidipana* and *Amapachana* actions and is helpful in the alleviation of *Ama* from the body. *Pippali* has *Rasayana* and immune-modulator actions. It acts on *Agni* level and nourishes the malnourished *Dhatu* by its *deepan*, *pachan*, property. *Pranayama* particularly *Suryabhedhi kumbhak* mentioned in *Hatha Yog Pradipika* 2/48, has already been proved to give strength to *pranvaha srotas*, which is most affected in COVID-19 disease. They concluded that both the *Rasayan* formulations with regular practice of *Pranayam* showed good effect in the management of *Post*

COVID Syndrome. But they found more results of *Vardhman Pippali Rasayana* than *Ashwagandha Kalp* [41]. Other related studies were reviewed [42-53].

Conclusion

From this review and various research studies conducted on Ayurveda therapy it can be concluded that Post COVID syndrome can be effectively managed by adopting Ayurveda modalities. Still there is a need to conduct more research studies on it to prove efficacy of Ayurveda therapy in the management of Post COVID Syndrome.

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