



## Treatment Technologies of Human Coronavirus: Myth or Realism

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Received: 24.10.2021, Revised: 31.12.2021, Accepted: 19.02.2022

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**Abstract:** Since the outbreak of corona pandemic, in the absence of cure so far, many hit and trial techniques have been tried out for treating the disease COVID-19. In current scenario, numerous countries in the world are facing the fourth peak of the pandemic as Omicron, which is the new mutation of the Delta as the most dominant variant. As various medicine companies have declared different vaccines but none of them are claiming the hundred percent protection against this severe infection. In pursuit of the various available treatments, even rumour-mongering is thriving thick and fast. Many myths about treatment techniques were speeded through social media and people started to adopt them due to fear of psychosis and ignorance. The reported study focuses on the status of the pandemic world over so far, cause of COVID-19 including symptoms and testing mechanism, the insight on vulnerable section and the suggested protocol for them. It also highlights about the myths prevalent in the society and the fact check of the various treatment techniques adopted. This work also depicts the developmental status of COVID-19 vaccine all over the world and presents a comprehensive study of development of treatment technologies in order to pave way for researchers to work further in the quest of development of universal medicine(s) and vaccine(s) for treating the newly muted virus i.e., Omicron so that world becomes free of the menace or can commence normal life.

**Key words:** SARS-CoV-2, Omicron, NAAT (RT-PCR), ACE-2 receptors, anticoagulation, Immunity boosters

### Introduction

COVID-19 has gripped 214 countries / territories and 02 International conveyances namely Diamond Princess and MS Zaandam into its ambit. As per the statistics of the year 2020 until 14 October, the total number of COVID-19 infections were reported all over world stand at 3 crore, 84 lakh 11 thousand 580 with 10 lakh 91 thousand 625 deaths. Nearly 2 crore 88 lakh 77 thousand 123 people have recovered from it. Earlier, out of the total active cases, only 1% patients were reported severe symptoms. USA, Brazil, India and Russia together were contained 2 crore 17 lakh 90 thousand 349 cases i.e. 56.73% of the total infections world over. USA with 2, 20, 900,

deaths and Brazil with 1, 10, 645 deaths topped the number of deaths cases world over. Mortality percentage in terms of total number of infections were highest in Mexico (10.23%), Italy (9.92%), United Kingdom (6.78%) and Belgium (5.91%) which were much higher than the rest of the world. However, mortality figures are debatable because of no universally accepted definition of COVID related mortality or infection fatality. There were two kinds of mortality- infection mortality i.e. deaths among those infected which was globally about 1 per 1000 as all infected could not diagnosed due to insufficient testing



undertaken. Iceland where nearly the entire population was tested has given us some clarity about the infection mortality and the results of different serosurveys in Europe and India have shown that for each diagnosed case of COVID-19 there are 11-20 cases harbouring antibodies against COVID-19 who were neither symptomatic nor were tested but were otherwise infected. Therefore, in true sense infection mortality was not much higher as compared to other influenza viruses. The reported infection is a highly contagious disease that transmits due to the exposure of facial region to the droplets carrying corona virus. With the absence of a hundred percent foolproof treatment technique of the COVID-19 disease and unavailability of universal vaccine, it is posing difficulties in managing the pandemic world over. On 26 November 2021, WHO nominated the variant B.1.1.529 a variant of anxiety, named Omicron. This decision was based on the evidence that the Omicron has numerous mutations that may have an influence on how it behaves, and on how easily it feasts or the severity of illness it causes. A group of researchers in South Africa and around the world are in the track of studies to get the improved apprehension of Omicron. It is not clear whether Omicron is more communicable (for example, more easily spread from person to person) compared to other variants including Delta. In South Africa affected by this mutation, the number of people who have tested positive has increased, but epidemiological studies are ongoing to understand whether this is due to Omicron or other factors.

There is currently no information that the symptoms associated with Omicron are different from those of other variants. The first reported infections were college students— young people who tended to have milder illnesses—but it would take days to weeks to understand the severity of the Omicron variant. All variants of COVID-19, including

the Delta variant that dominates the world, can cause serious illness or death, especially for the most vulnerable people, so prevention is always the key.

In this paper, a review is being presented of the causes of COVID-19, vulnerable sections towards the COVID-19 and health management guidelines for them, fact check of the treatment techniques adopted, and development stage of the vaccine world over and the methods of boosting immunity.

**Cause of COVID-19:** Cause of COVID-19 is a novel corona virus named SARS-CoV-2. SARS-CoV-2 is a  $\beta$ -coronavirus (nCoV) similar to SARS-CoV and MERS-CoV viruses as it may cause the disease leading to pulmonary failure and potentially fatal respiratory tract infection like them and hence is given the name SARS-CoV-2 (Astuti et al., 2020). Coronaviridae family was established in 1975 with two subfamilies, the coronaviruses and toroviruses. Corona viruses are a family of enveloped, positive sense single-strand RNA viruses (+ssRNA) classified within the Nidovirales order. Four types of coronaviruses find place in the family of Coronaviridae such as alpha corona virus (HCoV-NL63, TGEV/PEDV, PRCV), beta corona virus (SARS-CoV, MERS-CoV/HKU-4, MHV), gamma corona virus (IBV) and delta corona virus (PdCV) (Weiss et al., 2005; Li et al., 2016).

### **Structure of SARS-CoV-2**

It is an enveloped, non-segmented, positive sense RNA virus included in the sarbecovirus, ortho corona virinae subfamily which infects humans and other mammals. Positive strand viruses have all the information that can be translated in form of protein or other product without any intervening medium. Its diameter ranges from 65-125 nm, having single strands of RNA and provided with crown-like structure. It has largest genomes of all RNA



viruses, which is more than three times of HIV and hepatitis C, and more than two times of influenza virus. It has 30,000 genetic bases helical capsid and is one of the RNA viruses with a genomic proofreading mechanism. Proofreading capability provides sustainability to virus during harsh conditions. A special trick gives them a deadly dynamism due to which they can frequently recombine and swap chunks of their RNA with other corona viruses. Research findings suggest that SARS-CoV-2 contains as much as 96.2% identical genome sequencing as that of bat CoV RaTG13. Structurally, SARS-CoV-2 has four main structural proteins including spike (S) glycoprotein, small envelope (E) glycoprotein, membrane (M) glycoprotein, and nucleocapsid (N) protein, and several accessory proteins. The spike or S glycoprotein is a transmembrane protein that forms homotrimers protruding in the viral surface and facilitates binding of envelope viruses to host cells by attraction with angiotensin-converting enzyme 2 (ACE2) receptors present in lower respiratory tract cells. This glycoprotein is divided by the host cell furin-like protease into 2 sub units namely S1 and S2. Part S1 is responsible for the determination of the host-virus range and cellular tropism and binding with the receptor while S2 functions to mediate virus fusion in transmitting host cells (Fehr et al., 2015; Li et al., 2016; Astuti et al., 2020; Shereen et al., 2020; Jiang et al., 2020; Walls et al., 2020).

The nucleocapsid in corona virus called as N protein is localized in Golgi region of the nucleic acid material of virus and is responsible for processes related to the viral genome, replication cycle of virus and the cellular response of host cells in viral infections (Tail et al., 2019; Schoeman et al., 2019).

### **Intrusion and Immune Response to SARS-CoV-2**

SARS-CoV-2 is the member of Nirovirus family having deadly dynamism of frequently recombining and swapping chunks of their RNA with other corona viruses. It is capable of animal to human or human to human transmission. ACE2 receptors found in heart, lungs, kidneys and gastrointestinal tract (GI tract) facilitate the viral entry into target cells by attaching S glycoprotein (S1 subunit) to the receptor (Li et al., 2016; Astuti et al., 2020). Receptor binding domain (RBD) of SARS-CoV-2 spike protein is key to entry in human cells. Its dynamism makes it efficient enough to do so unlike Yunnan bat virus that caused SARS. Corona virus spike protein (S1) is a multifunctional molecular machine that mediates corona virus entry into host cell surface through its S1 subunit and then fuses viral and host membrane through S2 subunit. After fusion occurs, the type II transmembrane (TM) serine protease (TMPRSS2) that is present on the surface of the host cell will clear the ACE2 receptor and activate the receptor-attached spike-like, S proteins (Simmons et al., 2019). Activation of the S proteins leads to conformational changes and allows the virus to enter the cells (Sungnak et al., 2020). Both of these proteins (TMPRSS2 and ACE2) are the main determinants of the entry of this virus. Nasal epithelial cells, specifically goblet/secretory cells and ciliated cells have shown to display the highest ACE2 expression throughout the respiratory tract SARS-CoV-2 virus thus entered releases its genomic material in the cytoplasm and become translated in the nuclei (Yi et al., 2020). SARS-CoV-2 virus is capable of affecting all the organs where ACE2 receptors are present. When the virus infects the cells, the innate immune response first tries to clear the infected cells by invoking an inflammatory response which explains most of the early symptoms. However, in cases where the



infected cells are not visible, the immune system may bring about a self-destruct response in form of Cytokine wave where large amount of inflammatory mediators are released. SARS-CoV-2 is capable of bypassing throat cells and reach straight down into the lungs. It can cause pneumonia to patient without depicting the usual mild symptoms such as cough or low-grade fever that would otherwise come first. Like SARS-CoV and influenza virus, SARS-CoV-2 infects and impairs the alveolar gas exchange due to inflammatory response. Alveoli are the tiny sacs in the lungs that shuttle oxygen into the blood stream and are the sites for gas exchange. As the cellular barrier, driving these sacs from blood vessels breaks down; liquid from vessels leaks in, blocking oxygen from getting to the blood. If the inflammation and tissue damage are too severe, the lungs never recover and the patient does not survive. Infection can trigger an excessive immune response known as cytokine storm, which can lead to multiple organ failure and death.

### **Symptoms and testing mechanism of SARS-CoV-2 virus**

The average incubation period of corona virus (time between contracting the virus and establishment of first symptom) is approximately 5-6 days; the better recommended range is 1-14 days. However, the affected person becomes infective from third day onwards and maximum viral load i.e. maximum infectivity to others just precedes onset of symptoms. Symptoms of corona positive case include low-grade fever in general, cough, fatigue, shortness of breath, cough with phlegm (expectoration), muscle pain (myalgia), headache, nausea, sore throat, diarrhoea, loss of smell (anosmia) or loss of taste (ageusia), headache, fatigue, confusion, rhinorrhea (runny nose) and / or nasal congestion, chest pain, pernio-like lesions (such as COVID toes). Presence of two or

more symptoms indicates the possibility of corona virus infection in the body and hence corona virus test may be prescribed. However, the patients with most of the above-mentioned symptoms are in general mild cases and probability of recovery upto 14 days is high even if they are isolated at home. Family of such patients are advised to follow strict home quarantine norms of 14 days as well as wearing triple layer surgical masks as per Government's guidelines. Corona positives with severity exhibit symptoms such as difficulty in breathing (dyspnea), persistent cough, persistent high fever, dip in oxygen saturation (Hypoxia) (SpO<sub>2</sub> <95% or increased respiratory rate > 24 min), persistent pain/ pressure in the central portion of the chest, slurred speech/ seizures, mental confusion or lack of alertness, weakness or numbness on the body, and bluish discoloration of the limbs or face. Fever is not a universal finding with corona positives and hence such cases are being referred as asymptomatic ones yet they may exhibit one or more of the other mentioned symptoms. Extra-pulmonary complications including cardiac injury, ischemic stroke, thromboembolic events (blood clots) and inflammatory complications have also been reported in severe cases (News-medical.net; McIntosh, 2019; Act Early Report. 2020; World Health Organization, Interim Guidance, 2020). Testing is very important aspect of COVID-19 management as timely detection determines the standard operating procedure of treatment in order to minimize mortalities. As per WHO's interim guidance issued on March 2, 2020 (World Health Organization, Interim Guidance, 2020) decision for corona testing should be taken on the basis of clinical and epidemiological factors. PCR (polymerase chain reaction) testing that involves testing of presence of antigen rather than the body's immune response or the building of antibodies should be preferred for asymptomatic or



mildly symptomatic cases preferably those who have contact history with corona positive individual(s).

### **Vulnerable Sections and Related Treatments**

Adaptability and strength become the hallmark of survival with role of immunity becoming more pronounced besides following universal masking with effective mask, hand hygiene and social distancing in order to win tough battle against COVID-19. According to Center for Disease Control and Prevention (CDC) USA ([www.cdc.gov](http://www.cdc.gov)) older adults aged 65 years onwards, asthmatics, diabetics, people with serious heart conditions, chronic kidney patients undergoing dialysis, people suffering from severe obesity (BMI 40 or above), people in nursing homes, liver patients and people in immuno-compromised state i.e. having a weakened immune system.

Children initially thought of in the susceptible category have shown much better response towards corona pandemic as the proteins that manufactures ACE 2 receptors are not fully developed. Anemia and malnutrition weakens the immune system of children and as per the 2015-16 National Family Health Survey (NFHS-4), India with 38% of children under five with stunted growth, 36% underweight and about 59% anemic children can be categorized as immuno-compromised ones and hence demand more care ([science.thewire.in/health](http://science.thewire.in/health); [rchiips.org/nfhs](http://rchiips.org/nfhs)). These categories have been advised to take utmost care against corona pandemic keeping in view the vulnerability. CDC USA ([www.cdc.gov](http://www.cdc.gov)) has issued health guidelines for the vulnerable section of society as described below:

People older than 65 years and those with many chronic medical conditions, such as those who are immuno-compromised or with significant liver disease are recommended to

receive vaccinations against influenza and pneumococcal disease.

For asthmatics with even moderate symptoms, risk factor is on the higher side so they are advised to follow proper protocol to keep asthma under control. They should continue with the current medications, including any inhalers with cortico-steroids in them but asthma triggers should be avoided. Asthma people should keep themselves at bay from disinfectants, sprays, crowded places, travel by cruise etc. People with chronic lung diseases, such as chronic obstructive pulmonary disease (COPD) including emphysema and chronic bronchitis, idiopathic pulmonary fibrosis and cystic fibrosis are also very much susceptible towards COVID-19. Chronic obstructive pulmonary disease (COPD) causes airflow blockage and breathing-related problems. Although there is no cure for COPD-19, it can be treated. COPD patients are advised to continue with the medication including cortico-steroids therapy. COVID-19 is capable enough to flare-up the severity of their medical condition.

Diabetics including type 1, type 2 or gestational types are also very much susceptible towards severity of COVID-19 and hence advised to continue with diabetes pills and insulin. They should hold control over blood sugar by exercising and meditations. Higher blood sugar may cause diabetes related problems and thus may weaken their fight against COVID-19. Patients with serious heart conditions including those having heart failure, coronary artery disease (CAD), congenital heart disease (CHD), cardiomyopathies and pulmonary hypertension are also at higher risk of incurring severity of COVID-19. Such patients are advised to continue prescribed medications such as angiotensin converting enzyme inhibitors (ACE-I) or angiotensin-II receptor blockers (ARB). Heart disease medication for treating heart failure, high cholesterol should continue





as per the prescription. Hypertensive patients should also continue with their prescribed medication for controlling blood pressure. COVID-19, like other viral illnesses such as the flu, can affect respiratory system and impede heart's normal function. The above-mentioned serious medical conditions aggravate the worsening of COVID-19 symptoms.

Chronic kidney patients sustaining on dialysis can also suffer from severity of COVID-19. Dialysis patients are more prone to infection and severe illness because of weakened immune system; treatments and procedures to manage kidney failure; and coexisting conditions such as diabetes. They should continue with their dialysis treatment as per schedule.

People having body mass index (BMI) 40 or above are categorised as Severe obesity patients and it puts them at higher risk Vis -a - Vis COVID-19. Such patients are advised to continue with the medication for underlying medical conditions during corona era. Severe obesity increases the risk of a serious breathing problem called acute respiratory distress syndrome (ARDS), which is a major complication of COVID-19 and can cause difficulties in breathing and hence may require doctor's able hands to provide respiratory support during serious illness.

Patients suffering from chronic liver diseases that include hepatitis A, B, C, liver cirrhosis, fatty liver are predicted at higher risk of incurring severe health conditions due to COVID-19 as research is still on and suffer severe liver damage and hence advised to take the exact medication as prescribed by the medical experts as liver can be strained because of symptomatic treatment in the light of COVID-19. According to National Centre for Immunization and Respiratory Diseases (<https://www.cdc.gov/ncird>), Division of Viral Diseases under CDC USA, SARS-CoV-2 can endanger the life of people with underlying

medical conditions and hence liver patients are always at risk of falling in the gamut of severity of COVID-19. It was observed that some patients hospitalized for COVID-19 have had increased levels of liver enzymes like alanine aminotransferase (ALT) and aspartate aminotransferase (AST) indicating temporary/permanent damage in liver. Food and Drug Administration USA (USFDA) ([www.fda.gov](http://www.fda.gov)) as authorized antiviral drug 'remdesivir' for specific COVID cases but not for treating hepatitis B or hepatitis C patients. Another vulnerable category in reference to corona pandemic are that of immuno-compromised people, such as cancer patients, patients who have undergone bone marrow or organ transplantation, HIV patients, patients with prolonged use of corticosteroids etc.

On the basis of prior knowledge of pandemics, it is assumed that immuno-compromised patients may have prolonged illness than other COVID-19 patients if infected with it. Cancer patients should stay at home and especially the ones who are being treated with chemotherapy are more prone to infections because of weakened immunity and hence can cause severe medical conditions due to COVID-19. They should be watchful towards fever, cough, sore throat, breathlessness like symptoms and are strictly advised to follow health and hygiene guidelines as prescribed and mentioned earlier such as maintenance of six feet gap, use of mask by self and near ones, frequent washing of hands etc.

The risk for people with HIV attaining severity in COVID-19 infection will be due to their low CD4 cell count, or not undergoing HIV treatment (antiretroviral therapy or ART). HIV patients are advised to maintain healthy diet plan, must have at least 8 hours of sleep, and should lead a stress free life. Continuity in treatment should be maintained without fail, as it is the best way of boosting the immunity. HIV patients should also take vaccination for seasonal influenza and bacterial influenza



besides following other precautions advisable to be followed during pandemic. The patients who have undergone organ transplants or bone marrow transplants are put on immunosuppressant drugs such as corticosteroids. There are certain others such as those suffering from perennial allergies that also undergo prolonged corticosteroid therapy are susceptible to severity of COVID-19 as they have weakened immune system. Such people are advised to follow the same protocol for warding off corona threat as followed by other immunocompromised categories mentioned earlier ([www.cdc.gov](http://www.cdc.gov)). Children below ten years of age are also susceptible towards the severity of COVID-19 as they are still at the immunity building stage and not thoroughly immunised with respect to vaccinations and boosters ([mohfw.gov.in](http://mohfw.gov.in)). Moreover, malnutrition in India is also one of the cause for concern and increases the risk of severity of illness in case of contracting COVID-19. That's why India has issued an advisory for people above 65 years of age and children below 10 years to take extra precautions in corona era ([timesofindia.indiatimes.com](http://timesofindia.indiatimes.com)).

#### **Diverse way to dealing with COVID-19: Fact Check**

World Health Organization (WHO) has invigorated its efforts to develop medicine and vaccine to fight COVID-19 ([www.cnbc.com](http://www.cnbc.com)). Intense drug trials are taking place worldwide, yet there is no proof that antimalarial drugs chloroquine and hydroxychloroquine (HCQ) are effective in treating COVID-19 ([theconversation.com](http://theconversation.com)). HCQ works at the level of cell membrane preventing the entry of the virus into the cell hence it will not work where the infection is established as it has no intracellular role. This fact is supported by the failure of HCQ in hospitalised patients. It is advisable to use chloroquine and hydroxychloroquine to treat COVID-19 and as

a prophylactic drug prescribed specially to health workers and the people who have proximities with COVID-19 patients under professional supervision only, as the misuse of hydroxychloroquine can cause serious side effects including impairing heart rhythm, retina damage, diabetes and other illnesses and even death (Yazdany et al., 2020; Nina et al., 2020; [www.drugs.com](http://www.drugs.com)).

Owing to all the mentioned complications, the mentioned drug can cause so it was often used in combination with azithromycin and other QT prolonging medicines. The QT interval is the time required for the heart to repolarize following the onset of depolarization. According to USFDA, hydroxychloroquine (HCQ) and chloroquine have not been found to be safe and effective drugs for treating or preventing COVID-19 as they may pose the increased risk of deterioration of existing heart and kidney problems ([www.fda.gov](http://www.fda.gov)). Some of the earlier researchers has also reported a serious toxicity and even death because of mistaken use of chloroquine ([www.dicardiology.com](http://www.dicardiology.com)). However, chloroquine and its derivative hydroxychloroquine were earlier hyped as a 'miracle drugs' against COVID-19, primarily by US President.

Two major clinical trials including "Solidarity Trial" by WHO and Wellcome Trust, Bill & Melinda Gates Foundation and Mastercard was conducted to validate the efficacy of HCQ and the combinational therapy of remdesivir, lopinavir and ritonavir as well as the anti-HIV combination drug with interferon beta 1b in treatment against COVID-19 ([www.gatesfoundation.org](http://www.gatesfoundation.org)). The use of convalescent plasma from cured patients to treat the infected COVID-19 patients have shown promising results world over including India ([www.deccanherald.com](http://www.deccanherald.com)). Besides convalescent plasma therapy various other immunotherapies such as monoclonal



antibodies against IL-6 receptor and complement protein C5, cytokine therapy, mesenchymal stem cell therapy and intravenous immunoglobulin are also under evaluation (Mansourabadi et al., 2020). Drugs Controller General of India (DCGI) gave approval to antiviral drugs Favipiravir and Favivir for treatment of mild-to-moderate Covid-19 cases and Remdesivir lyophilised powder for emergency use in hospitalised patients

([www.english.mathrubhumi.com](http://www.english.mathrubhumi.com); [www.livemint.com](http://www.livemint.com); [www.europeanpharmaceuticalreview.com](http://www.europeanpharmaceuticalreview.com)).

In the absence of specific treatment, focus of medical fraternity is to treat symptoms and augment the immunity bastion to fight against the intruder virus with maximum force and hence the need is felt for managing COVID with the support of Allopathy, Homoeopathy Ayurveda and Unani etc. For patients with mild symptoms, the treatment of symptoms like fever, cough, nausea is done with the advice of medical practitioners following the standard operating procedure along with intake of immunity boosters those include vitamins A, C, D, zinc, iodine etc. Ayurvedic immunity boosting measures as recommended by Ayush Mantralaya Govt. of India include intake of warm water throughout the day; practice of Yogasana, Pranayam and meditation; use of spices such as Haldi (Turmeric), Jeera (Cumin), Dhaniya (Coriander) and Lahsun (Garlic); intake of Chyavanprash, herbal tea/ decoction (Kadha) made from Tulsi (Basil), Dalchini (Cinnamon), Kalimirch (Black pepper), Shunthi (Dry Ginger) and Munakka (Raisin) once or twice a day. Addition of jaggery and lemon juice will do value addition as per the need. Golden milk made up of half-teaspoon Haldi (Turmeric) powder in 150 ml hot milk once or twice a day will help bolster the immunity as Haldi is the source of curcumin that contains antibacterial, antiviral and antifungal properties. Application of

sesame oil/coconut oil or Ghee in both nostrils (Pratimarsh Nasya) will help keep nasal openings clear. Steam inhalation with fresh Pudina (Mint) leaves and Ajwain (Caraway seeds) will help mitigate sore throat and dry cough. Lavang (Clove) powder mixed with natural sugar / honey can help cure cough or throat irritation (Ali et al., 2020; [www.mohfw.gov.in](http://www.mohfw.gov.in)).

Giloy or Guduchi (*Tinospora cordifolia*) a climbing shrub widely used in Ayurveda due to the presence of various active components such as alkaloids, steroids, aliphatics, glycosides, diterpenoid lactones, sesquiterpenoid, phenolics, polysaccharides etc. that have exhibited anti-diabetic, anti-periodic, anti-spasmodic, anti-arthritis, anti-inflammatory, anti-allergic, anti-oxidant, anti-stress, anti-malarial, anti-leprotic, hepatoprotective, immunomodulatory and anti-neoplastic activities. Active compounds 11-hydroxymustakone, N-methyl-2-pyrrolidone, N-formylannonain, cordifolioside A, magnoflorine, syringin, tinocordiside etc. have been reported to have immunomodulatory and cytotoxic effects such as boosting the phagocytic activity of macrophages, enhancement of nitric oxide an indicator of anti-tumour effects. Aqueous extracts of *Tinospora* do affect cytokine production with up-regulation of IL-6 cytokine hence can be useful as an anti-inflammatory agent in COVID-19 also. *Tinospora cordifolia* root extract (TCE) has exhibited anti-HIV by reducing eosinophil count, stimulation of B lymphocytes, macrophages and polymorphonuclear leucocytes and haemoglobin percentage (Saha et al., 2012). This shows its efficacy as an antiviral agent. So more research is required in this area to test the effectivity of *tinospora cordifolia* in developing a medicine to treat COVID-19.

The pathological conditions of COVID-19 include hike in the counts of chemokines,





cytokines and leukocytes and increased levels of pro-inflammatory cytokines and C-reactive protein (CRP) that is manufactured in the liver (Mansourabadi et al., 2020). In the early stages of infection, increased CRP levels have been found to be correlated with lung lesions ultimately causing severe pneumonia. It has been recognised as an important biomarker for efficient prognosis and hence adopting a specific treatment (Wang et al., 2020; Chen et al., 2020).

At varied level of severity especially for the hospitalized patients, different combinations of therapies have been tried out in USA under FDA guidelines including remdesivir for low-flow supplemental oxygen in children and adults with COVID-19. The suggested adult dose is 200 mg intravenous on day 1 followed by 100 mg daily for 5 days which can be extended to 10 days as per the need. Remdesivir is not recommended for patients with alanine aminotransferase greater than or equal to 5 times the upper limit of normal. It is in general also not prescribed to the patients with an estimated glomerular filtration rate (eGFR) < 30 mL/min per 1.73 m<sup>2</sup>. Overall positive ramifications of remdesivir with patients not requiring high-flow supplemental oxygen or ventilatory support have been widely reported.

On the basis of elevation in inflammatory biomarkers such as D-dimer, ferritin, CRP etc. and pro-inflammatory cytokines such as interleukin-6 (IL-6), the clinical trials are still underway for testing IL-6 receptor blockers such as tocilizumab and sarilumab and the direct IL-6 inhibitor such as siltuximab. Favirapir is an RNA polymerase inhibitor and has shown to enhance SARS-CoV-2 RNA clearance from URT specimens at day 5 and higher as compared to HCQ or chloroquine in some clinical trials, though data are not sufficient. In non-severe cases in China with spO<sub>2</sub> level > 93 % favipir has exhibited faster

viral clearance as compared to lopanivir-ritonavir combination therapy by day 14. Interferons modulate immune response and may possess antiviral properties. In vitro application of interferon beta has been reported to inhibit SARS-CoV-2 replication. Further studies are needed to fortify the claim. Azithromycin HCQ combination therapy has shown adverse effect of QTc prolongation so not advisable in general. Lopanivir-ritonavir combinations have also lacked efficacy in treating COVID-19 so far. Ivermectin has been proposed as a potential contender due it's in vitro activity against SARS-CoV-2 virus. Though trial world over are still underway. Other antiviral agents being tested are sofosbuvir daclatasvir combination, famotidine, and colchicine. In the presence of uncertainty so far in effective treatment regime, trial data have shown clinical benefits of remdesivir with dexamethasone more than any other contender.

Ivermectin has shown favourable results in India as reported by medical practitioners and faculty members under the aegis of Academy of Advanced Medical Education. Ivermectin hinders the binding of the viral RNA to the genomic apparatus of the host cell and hence it help to reduce viral load despite infection. Ivermectin has been reported to inhibit host importin  $\alpha / \beta$  transporter protein which decreases translocation of SARS-CoV-2 nucleocapsid protein (NCP) from the cytoplasm of the nucleus hence disrupting viral propagation and survival. Due to its availability and affordability in India, it is being prescribed as prophylactic drug and to treat mild, moderate and severe cases of infection with the dose 12mg BD for 5 to 7 days (Vora et al., 2020).

Comprehensive analysis of hypercoagulability reports that upto 31% cases of thrombotic disease have been observed in COVID-19 patients leading to marked rate of mortality.



Anticoagulation therapy (use of blood thinners) prescribed to high-risk individuals exhibited mortality benefits. Though hypoxemia (low level of oxygen in blood) is the major cause of mortality in COVID-19 patients secondary to ARDS, yet thromboembolic events are adding woes to agony. Hypercoagulation in COVID-19 is reflected by the elevated levels of D-dimer test (more than 1000), von Willebrand factor (vWF), factor VIII, fibrinogen etc. Elevated D-dimer level could be secondary to elevated serum plasmin and hence antiplasmin compound therapies in high risk individuals helped improve mortality benefits. Prophylactic anticoagulation is recommended in all COVID-19 patients without contraindication and venous thromboembolism (VTE) in COVID-19 patients in intensive care unit (ICU) (Rico-Mesa et al., 2020; Singhania et al., 2020).

### Myths in practice

World Health Organization (WHO) has also issued guidelines against some of the myths in practice all over the world. Social media is playing a negative role in rumour mongering as people are marred by fear psychosis and negative psychology due to prolonged lockdowns.

Can adding pepper to soup or other meals prevent or cure COVID-19? Answer is 'No' though they are very tasty. Even hot beverages, gargle with salt, turmeric or listerine, use of hair dryer/ hand dryer are not capable of killing the virus at entry points of nose or throat. Similarly corona virus infection spreads through house flies has not been supported by any evidence yet. Spraying bleaching powder or any other disinfectant into the body cannot safeguard against COVID-19, rather it can cause injury because of their toxicity and should be used to disinfect surface only. Similarly drinking methanol or

ethanol also do not kill corona virus. Drinking them can lead to disability and death. At least 300 people died and more than 1000 fell seriously ill after consuming industrial methanol on 27 March 2020 in Iran for killing corona virus.

COVID-19 infection does not spread through 5G mobile networks as viruses cannot travel on radio waves/mobile networks. Sunny or hot the weather is not capable of killing corona virus. Countries with hot weather have reported cases of COVID-19. Ability to hold breath for more than 10 seconds without coughing does not confirm the absence of corona virus or any other lung disease in the body. Drinking alcohol consumption does not cure COVID-19, rather frequent or excessive alcohol consumption is injurious to health. Cold weather conditions or hot and humid conditions cannot kill novel coronavirus SARS-CoV-2 as the normal human body temperature is roughly 37°C, though there are some researches to show the decrease in the viral load on increasing the temperature but lot more are required to confirm the claim. Taking very hot water bath also cannot ward off the dread of corona pandemic from the body rather it can harm skin. Transmission of novel corona virus through mosquitoes has not been evident so far.

UV radiations cannot remove corona virus from hands or skin, they can damage eyes and capable of producing skin irritation. Thermal scanners are effective in detecting people with high fever due to novel corona virus. However, they are unable to detect asymptomatic carriers who have not fell sick with fever so far as it takes between 2 and 10 days and even higher before symptoms of fever, cough and other sicknesses come to fore.

Pneumococcal vaccine and Haemophilus influenza type B (Hib) vaccine, used for



giving immunity against pneumonia are ineffective against the SARS-CoV-2 virus, yet they are highly recommended for protection against respiratory illnesses. There is no evidence that rinsing nose with saline water help prevent nCoV-2 infection. Rinsing nose with saline water to some extent may help recover people from common cold but it has not shown any sign of preventing respiratory infections. Similarly, there have been no evidences so far that garlic consumption can prevent corona virus infection though it is a healthy food with some antimicrobial properties. People of all ages are equally susceptible towards contracting corona virus infection, but older people with co-morbidities are more vulnerable towards severity of illnesses. Antibiotics are also not effective and should not be used for prevention or treatment of COVID-19. However, hospitalized patients based on the doctor's advice may be prescribed antibiotics for treating other bacterial infections occurring with the 2019-nCoV ([www.who.int/emergencies](http://www.who.int/emergencies); [www.dailymail.co.uk/new](http://www.dailymail.co.uk/new)).

There is no specific medication for preventing or treating the novel corona virus (2019-nCoV) so far. Utmost care should be taken for treating symptomatic illnesses of COVID-19 patients. Despite being similar to common flu it can prove fatal for people with co-morbidities or immuno-compromised ones. The virus is fairly weak and can be contained through personal hygiene practices and avoiding contact with the infected people. One should avoid touching eyes, nose, and mouth and should stay at home when being sick. Nose and mouth should be covered while sneezing or coughing and tissue used should be thrown in the dustbin. Sanitization of frequently touched surfaces such as mobile phones, door handles and latches should be done frequently with sodium hypochlorite (10-15%) or alcohol-based sanitizers (70% and above). Hand washing for 20 seconds with

soap and water destroys outer protein cover of virus and kills it. Fatality in COVID-19 is much higher than in common flu and hence the development of an effective vaccine is need of the hour (Roult, et al., 2020; [www.cdc.gov/coronavirus/mers](http://www.cdc.gov/coronavirus/mers); Cascella et al., 2020). It is advisable not to get panic-stricken and over-cautious during pandemic as it can develop other psychological complications such as fear psychosis and obsessive compulsory disorder (OCD). Fear of contracting disease also induces the compulsion to its extremities. But absence of contamination fear may cause exposure to the disease. So there should be balanced mind for dealing with the existing situation. Over-exposure to media and social media should be avoided as they are full of unauthentic information ([www.psychologytoday.com](http://www.psychologytoday.com)).

### Conclusion

Currently, WHO is coordinating with a large number of researchers around the world to better understand Omicron. Current ongoing or upcoming research includes evaluating infectiousness, severity of infection (including symptoms), performance of vaccines and diagnostic tests, and effectiveness of treatment. So time is ripe to understand the importance of natural way of leading life, enhanced use of natural products including turmeric, basil, garlic, giloy (*Tinospora Cordifolia*), cardamom, cinnamon, nuts as immunity boosters to ward off diseases health and hygiene practices we are following including washing hands regularly with soap, use of alcohol-based hand sanitizers, abeyance from addictive substances, regular exercises, Yoga, meditation will not only help fight COVID-19, it will enable us fight against seasonal infections too those keep bothering us every now and then. Moreover in order to make our progenies strong as per the laws of natural selection, pregnant mothers should keep intoxications at bay, resort to safe health



and hygiene regimen, increase intake of nutritious food, listen to good music and reading good literature and lactating mothers must feed the infants as much possible as breast milk is regarded as the best immunity booster for a child. Based on our study we are sure that these practices will not only help us come out of corona pandemic unscathed, help become India a healthy society by improving physical, emotional and academic health of the countrymen also.

### Acknowledgement

We thank to Col (Dr) Amitabh Thapliyal (Retd.), Dr. Amit Pawiya (MBBS, MD), Associate Professor, School of Medical Sciences, Research, Sharda University, Greater Noida for providing the valuable inputs, updates, and suggestion related to this study of COVID-19.

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