

## PATHOGENESIS OF COVID-19 AND ITS RELIABLE SYMPTOMATIC MANAGEMENT THROUGH UNANI SYSTEM OF MEDICINE- AN OVERVIEW

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### ABSTRACT

The ongoing Novel Coronavirus disease 2019 (nCOVID-19) caused by SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus-2) has become a great public health concern worldwide. The first outbreak was in Wuhan, China in December 2019 which at present hits pandemic. Earlier, there were SARS (2002-2004) and MERS (2012) epidemics in China and Saudi-Arabia respectively. In comparison to SARS and MERS, COVID-19 escalated more rapidly due to increased global proliferation and the capability of the virus to easily adapt in every environment. In this review paper, we provide a brief introduction, dominant & rare features of SARS-CoV-19 and its possible pathogenesis according to classical Unani literature. As mentioned by various ancient Unani physicians, the symptoms of COVID-19 resemble more probable to *Nazla-e-Waba'iyya* (common flu) and hence the similarities and differences among them are stated. As per the Unani concept, there are recognizable changes in the climate, changes in air, infective humidity, which leads to "*Fasid mizaj*" causing *Amraz-e-Waba'iyya* (epidemic). In this context, effects of Unani anti-viral and immuno-modulatory drugs which assist in controlling the spread of infection are also described. Important issues and the guidelines issued by Ministry of AYUSH, Government of India for boosting immunity among the masses have also been discussed.

**Keywords:** Unani medicine, COVID-19, SARS-CoV-2, Herbal medicine, *Waba'*, Influenza, *Nazla-e-Waba'iyya* (common flu)

**Abbreviations:**

nCOVID-19: Novel Corona Virus -2019

SARS: Severe Acute Respiratory Syndrome

SARS-CoV-2: Severe Acute Respiratory Syndrome Corona Virus-2

MERS: Middle East Respiratory Syndrome

COVID-19: Corona Virus -2019

USM: Unani System of Medicine

**INTRODUCTION**

The technical name for the ceaseless corona virus SARS-CoV-2 is given by the International Committee of Taxonomy of Viruses (ICTV) [1]. Originally, tentatively it was named as 2019 novel corona virus (2019-nCoV). It is termed as Novel (nCoV-19), meaning "New" because it is caused by the new strain of corona virus (CoV) which was first identified in Wuhan, China in early December 2019 [2].

Corona viruses were first identified in the 1960s. There are three Corona viruses which have caused disastrous and detrimental outbreaks of pneumonia in human beings i.e. Severe Acute Respiratory Syndrome corona virus (SARS-CoV) in 2002-2003 and the Middle East Respiratory Syndrome corona virus (MERS-CoV) in 2012 [3]. The third one is the ongoing fatal corona virus of zoonotic origin. Corona viruses are named for the crown-like spikes that protrude from their surfaces resembling the sun's corona.

Earlier in the late 21st century, SARS and MERS caused fatal outbreaks and now the present emerging novel corona virus caused by SARS-CoV-2 is causing a significant threat to public health across the globe [4-6]. Due to the quick jump in the total number of confirmed SARS-Cov-2 cases as well as affecting several countries in a short time interval, the WHO designated it under a very high-risk category [7-14]. And as of 1 March 2020, a complete of 87,137 confirmed cases globally, 79,968 confirmed in China and 7169 outside of China with 2977 deaths had been reported by WHO. Hence, WHO declared it as pandemic on 12th March 2020 as it spread across six continents and more than 100 countries by then [15].

**HISTORICAL BACKGROUND****First epidemic in China**

There was an outbreak of pneumonia cases of unknown etiology in the city of Wuhan, the capital of Hubei, China. On 12th December 2019, the first COVID-19 patient was admitted with severe flu-like symptoms [16]. The initial onset of symptoms was unearthed between 8<sup>th</sup> December 2019 to 5<sup>th</sup> January 2020 as fever, cough and dyspnoea. Majority of patients were 40-69 year of age with male predominance. Although it affects people of all ages irrespective of educational and socioeconomic status. But from available data, it is a fact that the elderly are more

vulnerable to COVID-19 because they have multi factorial diseases like Hypertension, Diabetes Mellitus and other conditions [17,18]. On 12 January 2020, the WHO confirmed that a unique corona virus was the explanation for a respiratory disease during a cluster of individuals in Wuhan City, Hubei, China, which was reported to the WHO on 31 December 2019 [19,20].

### Epidemic in India

On 30 January, India reported its first case of COVID-19 in Kerala, which rose to three cases by 3<sup>rd</sup> February; all were students who had returned from Wuhan, China [21]. No significant rise in cases was seen in the rest of February. On 4<sup>th</sup> March, 22 new cases came in light, including an Italian tourist group with 14 infected members [22].

**Table-01-The number of COVID-19 positive cases globally till 3<sup>rd</sup> June 2020**

	Total no. of cases	Active cases	Recovered cases	Death	Reference
World	6.38M	-	2.73M	380K	[23]

**Table-02-Top ten most affected countries globally by COVID-19 till 3<sup>rd</sup> June 2020**

S. No.	Location	Cases	Recoveries	Death	Reference
1.	United State	1,869,668	420,756	107,648	[24]
2.	Brazil	558,237	240,627	31,309	[25,26]
3.	Russia	432,277	195,957	5,215	[27]
4.	United Kingdom	277,985	No data	39,369	[28,29]
5.	Spain	239,932	150,376	27,127	[30]
6.	Italy	233,515	160,092	33,530	[31,32]
7.	India	207,615	100,303	5,815	[33]
8.	Germany	184,091	166,428	8,674	[34,35]
9.	Peru	174,884	69,257	4,767	[36,37]
10.	Turkey	165,555	129,921	4,585	[38]

**Table-03- Top ten affected states of India by COVID-19 till 3<sup>rd</sup> June 2020 [39]**

S. No.	State	Total cases	Active cases	Recovered	Death
1.	Maharashtra	72,300	38,502	31,333	2,465
2.	Tamil Nadu	24,586	10,683	13,706	197
3.	Delhi	22,132	12,333	9,243	556
4.	Gujrat	17,617	4,631	11,894	1,092
5.	Rajasthan	9,373	2,735	6,435	203
6.	Madhya Pradesh	8,420	2,835	5,221	364
7.	Uttar Pradesh	8,361	3,109	5,030	222
8.	West Bengal	6,168	3,423	2,410	335
9.	Bihar	4,155	2,185	1,946	24

10.	Andhra Pradesh	3,898	1,413	2,421	64
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On 3<sup>rd</sup> June 2020, India reached 2lakhs cases (2,07615) with 1,01497 active cases, 100,303 recovered cases and 5,815 death.

Based on current, epidemiological investigation, the incubation period ranges 1-14days, mostly 3-7days[40].

The exact origin of the virus is still not clear. It's a mystery to the researchers worldwide. Further investigations need to be carried out to locate the exact source of infection. The epidemic of unknown acute respiratory tract infection broke out first in Wuhan, China since 12th December 2019 possibly related to a seafood market. However, there is no evidence so far that the origin of SARS-CoV-2 was from the seafood market. Rather, bats are the natural reservoir of a wide range of Corona viruses [41-45].

### CLINICAL FEATURES

The most common clinical manifestations include fever, dry cough and tiredness while the less common are sore throat, diarrhea, conjunctivitis, headache, loss of taste and smell, a rash on skin or discoloration of fingers or toes. The serious symptoms being difficulty in breathing, shortness of breath, chest pain or pressure, loss of speech or movement [46].

**Table-04- Most prevalent symptoms of COVID-19 according to percentage [47-49]**

S. No.	Symptoms	Percentage
1.	Fever	(85-90%)
2.	Cough	65-70%
3.	Fatigue	35-40%
4.	Sputum production	30-35%
5.	Shortness of breath	15-20%
6.	Myalgia and arthralgia	10-25%
7.	Headache	10-15%
8.	Sore throat	10-15%
9.	Chills	10-12%
10.	Nausea, Vomiting, nasal congestion	<10%
11.	Diarrhea	<5%

Critical symptoms include difficulty in breathing, persistent pain, confusion, difficulty in walking, bluish face or lips due to anoxia and ultimately death. As matter of rule, post-mortems or autopsies aren't being performed on the bodies of these dying after being confirmed positive for Covid-19 (in rare cases, tests done after somebody's death have found them to be positive for the novel corona virus). Some countries like Spain are an exception. But not too many autopsies are done even in this country to understand the precise reason for death of Covid-19 patients. What researchers have found is that Covid-19 is basically a respiratory illness. The novel corona virus primarily attacks tissues within the lungs. It causes a pneumonia-like condition within the

lungs. However, once a patient is infected with the novel corona virus or SARS-CoV-2, the disease has been found to cause fatal complications in heart, kidneys, blood vessels and brain. Researchers don't seem to be sure why exactly COVID-19 patients are dying. There are not any clear answers. Doctors have to study specific tissues in bodies of deceased Covid-19 patients to work out what's killing them. Post-mortems could provide the clues, but there aren't enough being done, not in China, the US or anywhere else [50]. Unani physicians described *Nazla-e-Waba'iyya* as common flu.

**Table-05- Symptomatic comparison of COVID-19 and *Nazla-e- Waba'iyya* (common flu)**

Diseases	Symptoms	Onset of disease	Incubation period	Recovery	Transmission of disease	Complication (if any)	Treatments	Reference / Resource
Novel Corona virus (COVID-19)	Fever Cough Shortness of breath Fatigue Headache Indigestion Diarrhoea Vomiting	Sudden	2-14 days after exposure	2-8 weeks	Human to Human	Acute pneumonia, Septic Shock, Respiratory failure in adverse conditions	No vaccines available, only symptomatic treatment	[51]
<i>Nazla-e-Waba'iyya</i> (common flu)	Runny or Stuffy Nose Sneezing Sore throat Mild Headache Low-grade Fever	Gradual	2-3 days after exposure	7-10days	Human to Human	Extremely rare or none	Symptomatic treatment is given	[51,52]

## **PATHOGENESIS**

Although the pathogenesis of COVID-19 is not properly understood, the similar mechanisms of SARS-CoV and MERS-CoV still can give us a lot of information on the pathogenesis of SARS-CoV-2 infection to ease our recognition of COVID-19.

## **BASED ON MODERN MEDICAL SCIENCE**

### **Entry and replication of Corona virus into the cell**

Corona virus S protein has been revealed as a significant determinant of virus entry into host cells [53]. The enwrapped spike glycoprotein binds to its cellular receptor, ACE2 for SARS-CoV

[54] and SARS-CoV-2 [55]. Initially, the entry of SARS-CoV into cells was identified to be accomplished by direct membrane fusion between the virus and plasma membrane [56,57]. There is endocytosis mediated SARS-CoV entry too [58,59]. The inhaled virus SARS-CoV-2 likely binds to epithelial cells in the nasal cavity and starts replicating.

### **Antigen presentation after infection**

After entering into the cells, its antigen will be presented to the antigen presentation cells (APC), which is a central part of the body's anti-viral immunity. Antigenic peptides are presented by major histocompatibility complex (MHC; or human leukocyte antigen (HLA) in humans) then recognized by virus-specific cytotoxic T lymphocytes (CTLs). Unfortunately, there is still a lack of any report about it, and we can only get some information from previous researches on SARS-CoV and MERS-CoV [60].

### **Humoral and cellular immunity**

The virus propagates and migrates down the respiratory tract along the conducting airways and the innate immune response is triggered. Antigen presentation subsequently stimulates the body's humoral and cellular immunity, which are mediated by virus-specific B and T cells. Similar to common acute viral infections, the antibody profile against SARS-CoV virus has a typical pattern of IgM and IgG production. The SARS-specific IgM antibodies disappear at the top of week 12, while the IgG antibody can last for an extended time, which indicates IgG antibody may mainly play a protective role [61], and the SARS-specific IgG antibodies primarily are S-specific and N-specific antibodies [53].

## **BASED ON CLASSICAL UNANI LITERATURE**

### **Concept of virulent and epidemic diseases in Unani medicine**

There is no data available in the name of Corona or SARS in any classical Unani literature but surely its pathogenesis can be extracted from the well-known and esteemed ancient books of Unani medicine by correlating the similarities of the symptoms with the disease. However, the classification of endemic/epidemic/pandemic disease entitled in Unani literature explains COVID-19 under the heading of *Nazla-e-Waba'iyya* (common flu) and *Humma-e- Waba'iyya* (infectious fever) as their symptoms are analogous with that of COVID-19.

### **Concept of *Humma-e-Waba'iyya* (infectious fever)**

It is a type of mortal fever which occurs due to unusual changes in the *Hawa'-e-Muhit* (air) either qualitatively or quantitatively. As a result, the air becomes impure and finally, it gives rise to the abnormal temperament of *Rooh* (Pneuma), which subsequently results into morbidity and mortality because as *Hawa'-e-Muhit* (fresh and pure air) is crucial quality health [62,63]. This fever is mainly low grade or mild but consequences are threatening, a patient feels burning and excessive aggressiveness, breathlessness, having a foul smell, high pitch breath, and pain in the

upper part of the stomach or cardiac part of the stomach, polydipsia, dry tongue, nausea, loss of appetite, restlessness, and discomfort, sometimes dry cough and due to excessive weakness can cause shock, *Ikhtilat-e-aql* (memory disturbance) [52, 63-67]. A person who has a weaker immune system i.e. older and children, accumulation of morbid humour and widening of skin pores are highly susceptible. *Rabban tabri* stated that people who have an excess of morbid humour in their body are usually affected by *Humma-e- Waba'iyya* (infectious fever) [62,63].

### Concept of *Tabi'at*

Ancient Unani physicians have also described the concept of *Tabi'at* (physic or maybe immunity), which is the foremost executive of the human body to create a healthy environment inside and prepare to fight against any infection. If *Tabi'at* is strong then a person doesn't suffer from any disease. If *Tabi'at* weakens, an individual becomes prone to diseases. Thus the *Tabi'at* plays the major role to provide general administration as well as a defense or immunity. Unani scholars recommended to improve body immunity and to reinforce the *Tabi'at* for restoration of health and prevention from diseases. Hippocrates stated that there is special ability hidden in every individual called the defence mechanism of the body or we can say it *Quwwat-e-Muddabbira-e-Badan* (Immunity) [68].

### The concept of gastro-intestinal symptoms in COVID-19 according to USM

*Rutubat-e-Ghariziyya* plays a key role in maintaining the equilibrium of *Hararat-e-Ghariziyya* (optimum temperature of the body). When the quality and quantity of *Rutubat-e-Ghariziyya* change, it directly affects *Hararat-e-Ghariziyya*. Excessive *tahleel* (reduction) in *Hararat-e-Ghariziyya* causes a change in *Huzoom-e-Arba'* [69-71].

According to ancient Unani Scholars, In USM, Epidemic referred to as *waba*, which is believed to occur due to *Ajsam-e-khabita* (micro-organism) present mainly in air and water. The symptoms of *Nazla-e- Waba'iyya* (common flu) more likely resembles common flu.

- According to Ibn-e-Sina, the changes in the constituent of air makes it contaminated. i.e. presence of *Ajsam-e-Khabita* (micro-organism) in air becomes the major source of infection once inhaled. This type of change in the air mainly occurs in a humid climate, damp areas and mainly in the winter season [52].
- Hippocrates stated that polluted (contaminated) air comprising infective substances are the cause of epidemic diseases. Such epidemic diseases lead to death because the infective substance present in the air affects the heart. It also causes respiratory distress and low-grade fever, lethargy, body ache, vomiting and occasionally diarrhea [72].
- *Ibn-e-Hubal bhagdadi* mentioned it as "if the southern winds are replaced by the northern wind then flu-like symptoms occur [73].

- *Zakariya Razi*, mentioned in one of his famous book *Al-Hawi* 15<sup>th</sup> volume that “changes in the southern and northern winds causes a change in temperature as southern winds are warmer and northern winds are colder and hence causes many airway infections”[63].
- *Razi* described to an extent regarding the concept of contamination of contagious diseases in his book *Al-Hasba-wa-Judri*. He has also mentioned in one of his prestigious book *Kitab-al-Mansoori* that *waba* mostly occur in the autumn season when the climate is humid [74].

## MODE OF TRANSMISSION

According to current evidence, COVID-19 virus is primarily transmitted between people through respiratory droplets and get in touch with routes [75-81]. Droplet transmission happens when an individual is in immediate contact i.e.; less than 1m with someone who has a respiratory illness (cough or sneezing) and is therefore at high risk of having their mucosa (mouth and nose) or conjunctiva (eyes) exposed to potentially infective respiratory droplets. The transmission also occurs through fomites with the infected person. An orofecal route of transmission is also considered as viral RNA has also been detected in faeces. Airborne transmission is not completely ruled out [82].

## DIAGNOSTIC CRITERIA

Primarily, clinical diagnosis of COVID-19 can be recognized based on clinical features, history, epidemiology, and some secondary examination. So far, the golden clinical diagnosis method of COVID-19 is macromolecule detection within the nasal and throat swab sampling or other tract samplings by real-time PCR and further confirmed by next-generation sequencing as is known of the date [83]. Apart from this, we can predict it by the principles of diagnostic criteria in Unani such as *Nabz* (Pulse) and *Baraaz* (Stool), usually, *Nabz* is found to be *Sagheer-wa-Mutawatir*, and the *Baraz* (stool) of infected person has a foul smell as mentioned for *Nazla-e- Waba'iyya* (common flu) [62,84].

## PROBABLE APPROACH TOWARDS THE PREVENTION AND MANAGEMENT OF COVID IN THE VIEW OF UNANI MEDICINE

### About the Unani System of medicine

Indian Traditional system of medicine is considered as one of the age-old methods of treatments. It includes Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy (AYUSH), which tend to manage and treat many diseases.<sup>[85]</sup> Unani medicine has been used in the control of communicable diseases for thousands of years and hence there is obvious scope for the intervention of Unani drugs as a complementary and prophylactic therapy for the management of COVID-19 patients. Unani system of medicine has its influence and reputation in society. USM uses plants, minerals and animal products as a drug for curing human diseases [86].



### **Need and scope of Unani drugs in this pandemic**

The holistic approach of USM focuses on prevention through *Asbab-e-sitta Zarooriya* like lifestyle modification, dietary management, prophylactic interventions for improving the immunity and the drugs are given based on *Ilaj-bid-Zidd* (treatment by the opposite temperament of disease) [87]. Due to the absence of a selected antiviral therapeutics and vaccine, the most treatment strategy for COVID-19 is supportive care, which is supplemented by the mixture of broad-spectrum antibiotics, anti-viral, corticosteroids and convalescent plasma. Since ancient times, Indian herbs have been used as a treatment and preventive measure for several diseases, including respiratory viral infections. The benefit of using these herbs in viral respiratory infections is to build immunity and anti-inflammatory modulating effects to manage the immune system [88].

### **The role of Unani drugs and their mode of actions**

About 25,000 plant-based formulations have been used in folk remedies in Indian medicine. A single herb may contain many phytochemical constituents that function alone or in combination with other compounds to produce the desired pharmacological effect [89]. The antiviral effects of medicinal plants have played an incredible role at different stages of viral growth [90]. Plant-derived pharmacological formulations marked a major contribution to viral infections. Furthermore, researches on these herbs and medicinal plants are necessary to promote their usage in clinical practice to prevent or treat various illnesses. Since many Indian medicinal plants exhibit antiviral, anti-inflammatory and antioxidant with immune-modulatory actions, it may be favorable to consider them for the treatment of COVID-19. Though standard clinical trials should be carried out to scientifically prove their efficacy [91].

### **Prophylaxis measures in Unani System of medicine**

As per Unani classical foresight, improving immunity with immune boosters is one of the key approaches for prevention of diseases and maintenance of health. Therefore, a strategy to enhance immunity and provide symptomatic relief in upper respiratory tract infection is advocated.

*Ismail Jurjani* (1041-1136 CE) mentioned that use of *Tiryaaq* (anti-dote) during epidemics strengthens the heart and keeps the body faculties strong [92].

Under the light and guidelines of Unani medicines, we recommend the following preventive measures and management options in the light of Unani medicine.

**Table-06- Unani Anti-viral singledrugs recommended for health management during the times of epidemics**

S. No.	Unani Name	Scientific name	Parts used	Method of use	Reference
1.	<i>Adrak</i>	<i>Zingiber officinale</i>	Rhizome	Oral as a decoction and also as a tea	[93]
2.	<i>Lehsun</i>	<i>Allium sativum</i>	Clove	Oral as spices	[94]
3.	<i>Amaltas</i>	<i>Cassia fistula</i>	Kernel	Oral as decoction	[95]
4.	<i>Mulethi</i>	<i>Glycyrrhiza glabra</i>	Root	Oral as decoction	[96-105]
5.	<i>Haldi</i>	<i>Curcuma longa</i>	Stem	Oral with Milk	[106-112]
6.	<i>Anar</i>	<i>Punica granatum</i>	Fruit Juice	Oral	[68,113]
7.	<i>Giloy</i>	<i>Tinospora cordifolia</i>	Stem	Oral as decoction	[114,115]
8.	<i>Kalonji</i>	<i>Nigella sativa</i>	Seed	Oral as decoction and safoof	[116]
9.	<i>Khaksi</i>	<i>Sisymbrium officinale</i>	Seed	Oral as decoction	[114,117,118]
10.	<i>Neem</i>	<i>Azadirachta indica</i>	Whole plant	Oral as decoction	[119-121]
11.	<i>Asgandh</i>	<i>Withania somnifera</i>	Root	Oral as decoction and tablet	[122]
12.	<i>Umbab</i>	<i>Ziziphus jujube</i>	Fruit	Oral as decoction	[67,123]
13.	<i>Gulab</i>	<i>Rosa demescana</i>	Petals(distillate)	Fumigation	[124]
14.	<i>Banafsha</i>	<i>Viola odorata</i>	Flower	Oral as decoction	[125]
15.	<i>Halela</i>	<i>Terminalia chebula</i>	Fruit	Oral as decoction	[126]
16.	<i>Imli</i>	<i>Tamarindus indica</i>	Seed	Oral as decoction	[127]
17.	<i>Revand Chini</i>	<i>Rheum emodi</i>	Root	Oral as decoction	[128]
18.	<i>Sirka</i>	<i>Vinegar</i>	Liquid	Oral with food	[63,129]
19.	<i>Sumaq</i>	<i>Rhus coriaria</i>	Fruit	Oral as decoction	[130]
20.	<i>Toot</i>	<i>Morus alba</i>	Fruit	Oral as fruit and syrup	[131]
21.	<i>Zafran</i>	<i>Crocus sativus</i>	Stigma	Oral with Milk	[132]

**Table-07:Single Unani Immuno-modulator drugs recommended for health management during the times of epidemics**

S. No.	Unani name	Scientific name	Parts used	Method of use	Reference
1.	<i>Amaltas</i>	<i>Cassia fistula</i>	Pulp	Oral with decoction	[68,133]
2.	<i>Chal-e-konain</i>	<i>Cinchona officinalis</i>	Bark	Oral with decoction	[134]
3.	<i>Giloy</i>	<i>Tinospora cordifolia</i>	Stem	Oral as decoction	[114,135-137]
4.	<i>Kalonji</i>	<i>Nigella sativa</i>	Seed	Oral as decoction and safoof	[138-140]
5.	<i>Amla</i>	<i>Emblica officinalis</i>	Fruit	Oral as Murraba	[114,141,142]
6.	<i>Neem</i>	<i>Azadirachta indica</i>	Whole plant	Oral as decoction	[143,144]
7.	<i>Asgandh</i>	<i>Withania somnifera</i>	Root	Oral as decoction and tablet	[145-147]

8.	Zafran	<i>Crocus sativus</i>	Stigma	Oral with Milk	[68,148]
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**Table-08- Compound Unani formulations for symptomatic management of CoVID-19 [149]**

S. NO.	System involved	Symptoms	Drug	Dose	Type of drug	Unani form of drug
1.	Respiratory	Dry Cough	Habb-e-Surfa	125 mg pill twice a day for 6-12 year of age	Solid(Pill)	Habb
				250 mg pill twice a day for above 12 years of age		
			Khamira-e-Banasha	5 gm twice a day for 6-12 year of age	Semisolid	Majoon
				10 gm twice a day for above 12 years of age		
			Laoq-e-Sapistan	5 gm twice a day for 6-12 year of age	Semisolid	Majoon
				10 gm twice a day for above 12 years of age		
		Sharbat-e-Sadar	10 ml twice a day for 6-12 year of age	Liquid (Syrup)	Sharbat	
			20 ml twice a day for above 12 years of age			
		Sore throat	Sharbat-e-Toot Siyah	10 ml twice a day for 6-12 year of age	Liquid (Syrup)	Sharbat
				20 ml twice a day for above 12 years of age		
		Difficulty in Breathing	Laoq-e-Katan	5 gm twice a day for 6-12 year of age	Semisolid	Majoon
				10 gm twice a day for above 12 years of age		
			Habb-e-Hindi Zeeqi	125 mg pill twice a day for 6-12 year of age	Solid (Pill)	Habb
				250 mg pill twice a day for above 12 years of age		
Arq-e-Ajeeb	4 drop Inhalation twice a day	Distillate (extract)	Arq			

			Roghan-e-Baboona	10 ml Locally massage on chest twice a day	Oil	Oil		
2	General symptoms	High-grade fever and headache	Habb-e-Bukhar	250 mg pill twice a day for 6-12 year of age	Solid (Pill)	Habb		
				500 mg pill twice a day for above 12 years of age				
			Habb-e-Mubarak	1 gm pill twice a day for 6-12 year of age	Solid (Pill)	Habb		
				2 gm pill twice a day for above 12 years of age				
3	Digestive illness	Diarrhoea	Habb-e-Pench	1 pill twice a day for 6-12 year of age	Solid (Pill)	Habb		
				2 pills twice a day for above 12 years of age				
			Qurs-e-Malti Basant	1 pill twice a day for 6-12 year of age			Solid (Tablet)	Qurs
				2 pills twice a day for above 12 years of age				
		Vomiting	Jawarish Anaren	3-5gm twice a day for 6-12year of age (before meal)	Semi-solid	Jawarish		
				5-7 gm twice a day for above 12 years of age (before meal)				
			Sikanjbeen-e-Leemuni	3-5 tsf twice a day for 6-12year of age			Liquid	Sikanjabeen
				5-7 tsf twice a day for above 12 years of age				
		Indigestion	Safoof-e-Hazim	3-5 gm twice a day for 6-12year of age	Powder	Safoof		
				5-7gm twice a day for above 12 years of age				

			Jawarish Jalinoos	3-5gm twice a day for 6-12year of age	Semi-solid	Jawarish
				5-7 gm twice a day for above 12 years of age		
			Safoof-e- Tabkheer	3-5 gm twice a day for 6-12year of age	Powder	Safoof
				5-7gm twice a day for above 12 years of age		

### PROPHYLACTIC TREATMENT GIVEN BY AYUSH IN DIFFERENT STATES OF INDIA

In USM, prevention has been preferred for treatment. Its classical literature mentions that *Quwwat-i-Mudabbira-i-Badan / Tabi'at* (Immunity/Physic) is the supreme power, which controls all the physiological functions of the body and provides immunity against diseases. Hence the focus is mainly to improve and strengthen immunity [68].

**Table-09- Unani medicine recommended by the following states of India in COVID-19 prophylactic management**

S. No.	State	Treatment	Dose
1.	Govt. of Delhi (NCT)	<i>Joshanda (Decoction)of</i> <i>Behidana- 5 gm</i> <i>Barg-e-Gaozban- 7 gm</i> <i>Unnab- 5 dana</i> <i>Sapistan- 7 dana</i> <i>Darchini- 3 gm</i> <i>Banafsha- 5 gm</i>	Boil these ingredients in 250 ml of water for 15 minutes and take warm like regular tea once or twice a day.
2	South Delhi Municipal Corporation(MCD)	Khameera Abresham Sheera Unnab wala	6 gm. twice in a day
		Kalonji 500 mg with Honey 20 ml	Thrice in a day
		Josheena	25 ml twice in a day
		Khameera Marwareed Khas	6 gm. once in a day
3	Govt. of Karnataka	Use of ¼ teaspoon of fine powder of Kalonji with honey or warm	Once in a day

		water	
		Use of <i>Khajoor</i> (dates), <i>Anjeer</i> , <i>Sabudana</i> , <i>Moong dal</i> , <i>Barley</i> , soups of seasonal vegetable etc. in diet Regular use of spices like <i>Turmeric</i> , <i>Cumin</i> , <i>Ginger</i> , <i>Garlic</i> , <i>Mint</i> and <i>Black Pepper</i> in preparation of food.	As per diet
4	Govt. of UP	<i>Decoction of Behidana- 3-5 gm</i> <i>Unnab- 5 piece</i> <i>Sapistan- 9 piece</i> <i>Karanjwa- 3-5 gm</i>	Boil these ingredients in one litre of water for 15 min. and take warm like regular tea once or twice a day.
		<i>Roghan-e-Babuna</i>	Local application on Chest
		<i>Arq-e-Ajeeb</i>	2-5 drops for inhalation
		<i>KhameeraMarwareed</i>	3-5 gm twice in a day with milk
		<i>Safoof-e-Asgandh</i>	5 gm. with water twice in a day after meal
	Anti-Viral Drugs	<i>Kalonji</i>	1-2 gm. with lukewarm water twice in a day
		<i>Lehsun</i>	2-3 gm. paste with honey twice in a day
		<i>Zanjabeel</i>	3-5 gm. paste with honey twice in a day
		<i>Asalasoos</i>	5-10 gm. decoction prepared in 100-150 ml of water and taken as a tea
		<i>Afsanteen</i>	A 3-5gm decoction prepared in 100-150 ml of water and taken as a tea
		<i>Tukhm-e-Kasoos</i>	A 10-15gm decoction prepared in 100-150 ml of water and taken as a tea
		<i>Giloey</i>	5-10 gm decoction prepared in 100-150 ml of water
		<i>Khayar Shambar</i>	10-20 gm decoction prepared in 100-150 ml of water used for gargle

## INFORMATIVE HIGHLIGHTS

### General precautionary measures [150]

1. Avoid attending functions, people gathering events and maintain social distancing.
2. Frequent washing of hands with soap and water and use of alcohol-based sanitizer.
3. Avoid touching eyes, nose and mouth.
4. Clean and disinfect frequently touched objects and surfaces.
5. Use of face mask in a rhythmic manner.
6. Practice good respiratory hygiene including breathing exercise, walk regular up to half an hour.
7. Maintain sanitation and general hygiene.

8. Avoid visiting the markets and shops where live or dead animals are handled.
9. Isolation of a vulnerable population like elderly people, pregnant women and people having co-morbid conditions such as hypertension and diabetes mellitus.
10. If you suspect Corona Viral infection, wear a mask and contact your nearest hospital immediately.
11. Stress-relieving measures are equally important to follow. Hence, certain Unani drugs like *Ood Saleeb* (*Paeoniaemodi*), *Jadwar* (*Delphinium denudatum*), and *Sa'd Koofi* (*Cyperus rotundus*) may be beneficial.
12. *Bakhoor* (fumigation) in the house at frequent intervals with the combination of *Kafoor* (*Cinnamomum camphora*) and *Sandal* (*Santalum album*).

### Personal Protective Equipment [151-155]

1. Eye protecting goggles
2. N-95 face mask with respirator
3. Complete PPE suit with 120 GSM which is waterproof and fireproof also.
4. Thick medical latex gloves
5. Gown
6. Face shield / vibors
7. Head cover

### Special Care for Elderly

Unani physicians categorized elderly people under *Abdan-i-Zaifa* (weaker bodies). This is one of the main factors that they have a higher susceptibility for acquiring different illnesses. Based on available data to date, it is a fact that the elderly are the most vulnerable people to this disease all over the world. Based on the principle of Unani medicine high vulnerability among the elderly is due to their *Barid-Yabis Mizaj* (cold and dry temperament). *Sin-e-Shaikhukhat* (old age) is that the period during which *Hararat-e-Ghariziyya* (innate heat) and *Rutubat-e-Ghariziyya* (innate moisture) reduced gradually, and dominated by *Rubat-e-Ghariba Bala* (abnormal metabolic products) that weakens the *Tabi'at* (a power which controls the homeostasis / internal environment of the body) and slows down the bodily functions. In this period deterioration in the powers and faculties of the body is noticeable. This diminished quantity of *Rutubat-e-Ghariziyya* and *Hararat-e-Ghariziyya* cause altered temperament in Elderly; hence *mizaj* becomes *Baarid-Yabis* (cold and dry) [69-71]. And this *mizaj* resembles that of *Balgham*. On analysis of disease, preliminary COVID-19 can be associated with *Bhalghami* (phlegmatic) disease. As phlegm is the coldest humour, it increases the susceptibility among the elderly [52].

General guidelines are provided for maintaining good health for the elderly [52,71,156].

1. The diet should be per *Mizaj* (Temperament)
2. A nutritive and easily digestible diet should be taken
3. Frequent meals in small quantity

4. Avoid drinking cold water
5. Maintain good bowel habits
6. Avoid constipation
7. Maintain adequate sleep
8. Perform moderate exercises

## QUARANTINE

If anyone is found to have COVID-19 like symptoms then self-isolation and quarantine for 14 days are recommended. Great 11<sup>th</sup> century Persian physician *Ibn-e-Sina* was the first to use 40-day sanitary isolation *al-Arba'iniya* (the fourteenth) to prevent the spread of disease. Venetian merchants adapted this as "Quarantine"(quranta+ina, forty days) later became popular all over Europe [52].

## MESSAGE IN ISLAM REGARDING PREVENTION OF INFECTION

There is also this very beautiful and informative "Hadith" by The Prophet Mohammad S.A.W. (PBUH) that: "If you hear of an outbreak of plague in a land, do not enter; but if the plague breaks call at an area while you're in it, don't leave that place". Hence during this pandemic, the wisdom of this amazing hadith should be applied [157].

## DISCUSSION

The scientific community is only accepting evidence-based medicine that is why we are justifying the role of Unani medicine on a scientific basis. In the prevention and treatment of COVID-19 Unani medicine have ample amount of chance and potential. It will provide enough scope for learning and will give rise to credible evidences. The drug plants we have mentioned are protease inhibitors, anti-retroviral and anti-viral which have been proven in in-vitro studies. As on date, we know COVID-19 is affecting only humans, rarely to animals. The plant drugs are easily available almost everywhere in India. Hence, executing the recommended plan within AYUSH health care facilities by Unani physicians will benefit the nation. World's oldest living health care system was originated in India. In this time of crises, world health community is continuously eyeing how India will use its traditional health care system and resources. China has already done this and now its India's turn to show how its traditional health care system will fight with ongoing pandemic. In these times, Unani medicine is a boon to the nation. It can definitely help the individual to boost their immunity and prevent themselves getting infected with the virus. As it is verily said 'prevention is better than cure.

## CONCLUSION

Novel corona virus outbreak infected people of China and caused upper respiratory disorders and is spreading worldwide since Feb 2020. No case has been successfully treated yet from any of 2019-nCoV cases. The number of morbidity and mortality is increasing day by day. The whole world is trying to learn about corona virus about its source, cause, pathogenesis and cure. But



based on Unani system of medicine, the antiviral herbal drugs may be used to cure this viral disease or to prevent it from the further spread and can save several lives. If such a study is done on scientific parameters then our country India may show a ray of hope to the rest of the world.

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