

## REVIEW ARTICLE

# Pandemic COVID -19 comparative analysis with MERSA and SARS , Etiology epidemic and current Interventions with future prospective

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### ABSTRACT

Since fifty decade most vulnerable lethal pandemic COVID -19 has shown to be more contagious as compared to SARS and Middle East respiratory syndrome (MERS) pandemic in 2003 and 2013, respectively. Globally 3,489,053 COVID -19 cases and 241 ,559 deaths has been reported till May 5 ,2020 approximately 26, 2020, due to outbreak of COVID-19. Middle east countries following china other countries worldwide posted so many preventive measures but still have considerable challenge financially and economically. Review provide some comparison of MERSA, COVID-19 and SARS with respect to etiology , sign symptoms , clinical complications and current preventive health strategies. The Corona virus has posed panic and scary situation worldwide. With lots of dramatic challenge and following strict mechanism of substantial prevention and massive control, there is decline in new cases in China; however, the worldwide pandemic situation remains worrisome. Currently FDA has not approved any Vaccine also no therapeutic regimen is determined for COVID-19. Based on the available data, this review systematically deliberates the etiology of three lethal epidemic (SARS, MERSA and covid-19), their epidemiology and clinical features and contemporary intervention trials linked to COVID-19 in the hope that it may provide a reference for future studies and support in the anticipation and control of the Pandemic.

Keywords: COVID-19; SARS-CoV-2; 2019-nCoV; (MERSA)Middle East respiratory syndrome virus; Intervention

Received 01.05.2020

Revised 08.05.2020

Accepted 30.05.2020

### How to cite this article:

F Kahtoon, A Al – Hazimi, M Kumar and D Verma. Pandemic COVID -19 comparative analysis with MERSA and SARS , Etiology epidemic and current Interventions with future prospective. Adv. Biores., Vol 11 (3) May 2020: 31-36

### INTRODUCTION

The first case “pneumonia of unknown origin” now named as Covid-19 outbreak is reported in china city wuhan then spread to various cities now pandemic mean involving multiple countries It is noted to be infected after exposure to the seafood market in Wuhan city of china now confirmed a frequently person to person transmission Since the sequences from First United State patients having “pneumonia of unknown origin” are similar to the first affected individual that China initially posted, suggesting a likely single, recent emergence of same viral genome. Studies shows that bats are important potential reservoirs both Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) and Middle East Respiratory Syndrome Coronavirus (MERS-CoV) although it is also suspected reservoirs for some of highly virulent zoonotic pathogens and deadliest viral diseases such as Ebola, and rabies [ 1,2,3]. Cases OF both of these two strains SARS-CoV and SARS-CoV-2 were initially documented in China with SARS-CoV is responsible more than thousand deaths. Since December 2019, the SARS-CoV-2 has infected 3,489,053 individuals and 241 ,559 deaths has occurred, according to WHO (updated as of May 5, 2020) [4,5]. As of this date, the number of confirmed cases is still increasing, as well as the number of deaths, although there are some increased level of Recovery patients too [6].

Proactive WHO and UNICEF policies and engagements are with faith-based organization is being undertaken to ensure that customs and religion are aligned and consider re opening of educational institutes and social meetings with controlled measures.

### **ETIOLOGICAL CHARACTERISTICS AND ORIGIN OF COVID-19**

Coronavirus disease 2019 (COVID-19), causative agent is found to be novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which belong to family Coronaviridae. There are seven types of known human coronaviruses (HCoVs) have been recognized, From these including HCoV-NL63, HCoV-229E, HCoV-OC43, HCoV-HKU1, SARS-CoV, and MERS-CoV. The first two belong to the Alpha-coronavirus genus and the latter four to the genus Betacoronavirus [6]. SARS-CoV and MERS-CoV can cause severe respiratory syndrome in humans, while the other five human coronaviruses may induce only mild to moderate upper flu like diseases in hosts having comorbid DM, COPD and Immunocompromised individuals [7, 8].

### **TRANSMISSION DYNAMICS AND EPIDEMIC STATUS OF COVID-19**

Various mode of transmission are identified including ocular, direct contact and respiratory droplets are the most lethal to known uptill. In a study by Wang JAMA 2020, 41% of patients were presumed to be related to transmission with in the hospital. Many initial COVID-19 cases were linked social places and sea food local market suggesting that SARS-CoV-2 was transmitted from seafood to humans [9]. However, a more recent studies has provided evidence that the infection was introduced from bat or pig or some unknown origin, into the local social gathering where it spread more easily, although air droplets and direct transmission may have occurred earlier [10]. Constellations of same infected family members and simultaneously groups of medical personnel have confirmed the presence of human to human transmission by direct handling [11]. After March, less than 10% of patients had arcade exposure and more than 70 individual as had no exposure to the social places [13]. Person-to-person transmission is thought to occur among close contacts mainly via respiratory air droplets produced when an infected individual coughs or touch some surfaces and transmit it by these means, fomites and sneezes particles may widely transmit the infection to others, as SARS-CoV has been found to persist on surfaces up to 72 to 96 hours [14] and some studies stated that coronaviruses can persist their as many as u to 8 to 9 days [15] Some recent study published also purported asymptomatic transmission to be another challenge for health workers and professionals [20], but these study could be limited by means errors in self-reported flu like symptoms or contact with infected person so one cannot neglect the bias. Another study specified the mean incubation period was approximately 5 days (95% confidence interval [95%CI]: 4.1–7.0) [16]. Although it has been establish to be as long as 19 or 24 day according to published data.

### **RECENT GUIDELINES AND INTERVENTIONS**

Identifying effective therapeutic regimen and some antiviral trails are on clinical trial to combat the Corona epidemics. Current guidelines [28,29] recommend lopinavir/ritonavir, ribavirin, chloroquine phosphate, as antiviral therapies and oxygen inhalation and non pharmaceutical measures as supportive care. Table 2 enlist some broad-spectrum antiviral drug that can inhibit the replication and growth of animal and human coronaviruses [22], while lopinavir is one of proteinase inhibitor used to treat AIDs infection, with ritonavir being used as a idolizer [30,31]. In some countries, the viral load infected patient was decline and patients condition was improved with combined dose administration of lopinavir and ritonavir [32]. However, Ribavirin, a synthetic guanosine analog and broad-spectrum inhibitor of RNA and DNA viruses, is frequently used for the treatment of SARS and MERS patients [32,33] some studies reported that single antiviral treatment, has less clinical efficacy as compared to combination of ribavirin and IFN-beta inhibited SARS-CoV replication However, ribavirin is accompanying with side effects may not be tolerated by immunocompromised hosts, including hemolytic anemia[34], indicating that ribavirin should be used with caution as a treatment for COVID-19. Some recent trail in China specified that chloroquine phosphate, previously used to treat malaria parasite[35, 36], may have some effectiveness and have good results against COVID-19 associated respiratory problems and lobar pneumonia, with satisfactory outcome [37,38]. Another useful antiviral drug for recently used clinical trail Arbidol, is a Russian-made trifling indole-derivative, was used for prophylaxis and management of influenza and other pulmonary viral infections [39,40]. Deng et al. in his clinical trial study [41] found that arbidol combined with lopinavir/ritonavir might delay the progression of lung lesions and reduce the viral load in COVID-19 patients. Table 2 shows all the mentioned drug options are associated with the treatment of SARS, MERS, viruses and additional randomized, prospective studies are still needed to determine their efficacy against COVID-19. Oseltamivir is a neuraminidase inhibitor indicated for the treatment of influenza [41].

Nafamostat inhibit MERS-CoV virus infection and is also used as therapy for Ebola virus Infections [98]. Favipiravir is a broad-spectrum antiviral that has potentially applicable for considering therapy for influenza and may also be effective against the Ebola virus [42].

Table 1;Major Pathological Findings in Various Organs and Tissue

Organ Affected	COVID =19	MERS	SARS	REFERENCES
LUNGS	Diffuse alveolar damagae	Diffuse alveolar damages /progressive deterioration of consensual respiratory infiltrates Necrotizing pneumonia Virus Localized by EM	Diffuse alveolar damage with varying degrees of acute exudative features including edema and hyaline membranes, organization, and fibrosis. Macrophagic or mixed cellular infiltration, multinuclear giant cells, atypical reactive pneumocytes, and vascular injury. Positive in situ hybridization signals in pneumocytes, lymphocytes, and macrophages	[16,17]
KIDNEY		Acute tubular injury Virus localized by EM	acute tubular necrosis, in varying degrees and other nonspecific features. Positive in situ hybridization signals in the epithelial cells of the distal tubule	[26]
HEART	No histological changes	No histological changes	Edema and necrosis of myocardial fibers	[ 22, 24]
MUSCLE		Myositis with muscle atrophic changes Virus localized by EM	Myofiber necrosis and atrophy, few regenerative myofibers	[20,22]
BRAIN	-	-	Edema and degeneration of neurons, several neurons in situ hybridization-positive	[24,26]
LIVER	Hepatitis	Normal	non specific but In some cases there is some sign of apoptosis	[21]
GI TRACT	Staining ACE2 and Viral nucleocapsid protein gastric duodenal and rectum glandular epithelial cells		Intestines: no obvious pathological changes/ nonspecific changes. Depletion of mucosal lymphoid tissue. Positive in situ hybridization signals in mucosal epithelial cells	[25]
Immune systems	-	-	both extensive necrosis of the spleen and atrophy of the white pulp with severe lymphocyte depletion have been found	[23]

Table 2. Treatment of Patients with COVID-19 [19,20]

Name of Therapy	Total [n=138 ]	ICU (n=360)	Non ICU(102)	P value	REFERENCES
Anti viral therapy	124 (89)	34(94)	90(88)	.36	By Dawel Wang <i>et al</i> [19,20]
Glucocorticoids	62(45)	26(72)	36(35)	< 0.001	
Oxygen inhalation	106(77)	4(11)	102(100)	> 0.99	
IMV Ivermectin	17(12)	17(47)	0	< 0.001	
ECMO	4(3)	4(11)	0	< 0.001	
CKRT	2(1)	2(5)	0	<0.001	
NIV	11(15)	15(42)	0	0.004	

Table 3. List of registered Antiviral Clinical trials [18]

<b>Antiviral</b>
Remdesivir
Anti-retroviral : Lopinavir ,Ritonavir , Darunavir and cobicitat
ASCO9/Ritonvir
Azuvdine
Chloroquine Phosphate*
Hydroxychloroquine*
Recombinant Human Angiotensin –Converting enzyme 2(rhACE2)

\*Antimalarial

### ROLE OF BALCK CUMIN/CHLOROQUINOLONE

Black cumin (*Nigella sativa* L.) seeds have been widely used in nutraceuticals and pharmaceutical products. Analysis of *Nigella sativa* essential oil show Black cumin exhibited diverse biological activities including antifungal, bactericidal and stronger antioxidant potentials against DPPH-radical in comparison with synthetic BHA and BHT antioxidants. Studies showed completely inhibit the growth of different Gram-negative and Gram-positive bacteria including *Staphylococcus aureus* and *Pseudomonas aeruginosa*. The Black cumin exhibited stronger radical scavenging activity against toxin produce some aptogological agent including *Penicillium citrinum*, *Bacillus cereus* and *Bacillus subtilis*, [43,44] The diversity of pharmaceutical applications raised industrial importance of bioactive compound of *Nigella sativa*. One of its derivative product Choloquinolone is and its therapeutic role in noval corona virus is needed to be focused by Researcher and a topic of debate by recent studies showing curative use against covid -19 [45,46]

### CONCLUSIONS

Pandemic COVID and MERS-CoV, and SARS-CoV, had been reported to cause severe human diseases by enveloped, positive-sense, single-stranded RNA Corona virus. Beside all preventive measures and antiviral drugs are life saving and proved to be supportive for pulmonary infections

### ACKNOWLEDGMENTS

The principal investigator would like to thank all the co authors for their support and effort Furthermore, the authors would like to extend their gratitude towards Dr Nuzhatparveen and Dr Naveed for helping in the analysis of the data and critically review. Wish the global epidemic of 2019 novel coronavirus pneumonia ends soon.

### CONFLICT OF INTEREST

The authors state that there was no conflict of interest in the preparation of this review.

### ETHICAL APPROVAL

This article does not contain any studies with human participants or animals performed by any of the authors.

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