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SARS-CoV-2 PANDEMIC: INTERPRETATION BASED ON CURRENT STUDIES

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ABSTRACT

At the end of 2019, a respiratory syndrome pandemic titled as corona virus disease 2019 or COVID-19) caused by SARS-CoV-2, brought havoc to the world. The typical daily symptoms included common cold, sore throat , fever, cough, mild nausea, vomiting but such symptoms usually clears up without treatment, or with antibiotics in most patients; but may become frightening in the coming days by getting turned into respiratory distress or organ failure. Corona virus spreads mostly from person to person through respiratory droplets, contact transmission or aerosol transmission. Vaccination is under process worldwide for such contagious disease. On the basis of newly released confirmations this article encapsulates the epidemic, transmission, clinical character traits, diagnosis, treatment and explicit preventions of corona virus disease 2019. The purpose of the present review is to discuss the brief of epidemiology in order to aware the public to identify and handle with SARS-CoV-2, and contribute citation for further studies.

Keywords: Covid-19, Pandemic, SAR-CoV-2, Corona virus

1. INTRODUCTION

By the end of 2019, an acute respiratory distress syndrome or ARDS known as corona virus disease or shortly covid-19 appeared in Wuhan, China. The covid-19 has transmitted speedily from Wuhan to rest of the china and eventually to the whole world. This corona virus disease was firstly recognized in a 55-year-old lady from Hubei province to have contracted COVID-19. Afterwards within short span of time patients with similar symptoms have found. The Corona virus Study Group of the International Committee on Taxonomy of Viruses designates it as severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), as it was analogues to SARS virus which is highly contagious disease. It can easily spread from human-to human. Basically corona virus is a whole family of viruses that have little spikes on the surface that look like a crown, which is how it got its name. Earlier here was the SARS corona virus and the outbreak was in 2002 and MERS corona virus, with an outbreak in 2012. And there are actually a lot of other types of corona virus, but they do not have special names and they just cause the common cold. The virus we are dealing with these days is called SARS-CoV-2 and the disease that it causes is corona virus disease 2019 or COVID-19 for short. Due to covid-19 many people have died across the world. According to latest report of World Health Organization Worldly, as on June 8 2020, there have been 6,931,000 positive cases of COVID-19 and 400,857 deaths. Highly affected country is America having 3,311,387 confirmed cases. Till now there is no vaccination for corona virus disease and it is a terminal illness. As consequences of these People have panic, fear, and they are just sitting in their house. Lot of countries has declared lockdown so that the infection of the disease can be prevented from spreading. On the other side it is also affecting economic conditions of countries worldwide, it is expecting to see the steepest slowdown since the great depression of 1930's. Other sectors like auto manufacturers, pharmacy industries, chemicals, electronics, solar power, information technology, shipping, tourism and aviation and textiles also not left untouched by this disease.

2. Elementary Conception of Corona Virus Disease (COVID-19)

Bats are actually a natural reservoir for many viruses, so the virus can actually replicate inside the bat without making it sick and then the bat passes it on to other animals and then finally that gets passed on to humans. SARS-

CoV-2 is easily transferrable among humans and demonstrates high potential for an epidemic **[1]**. In Wuhan (China) after the first person was infected, the virus got passed from person to person to person by people coughing and sneezing. In just one cough it can spray 3000 droplets that can go all over the place. If you get smacked in the face by someone's cough, you can get a direct transmission of the virus. But if it lands in the air, the virus can land on a particle and stay floating there for up to three hours. If it goes on to a cardboard box, it can last there for about twenty four hours. And then if it goes on to plastic, it can be there for 2 to 3 days. Unfortunately if you get in touch with that infected place and then touch your mouth, nose or eyes then you get infected. When the virus get enters in the body, it uses spikes like proteins on its surface to get into our cells. These spikes like proteins are like a key that unlocks receptors on the outside of the cell. These receptors are specifically the ACE 2-receptor on our lungs that corona virus is using to get inside our cells. Once the virus is inside the cells, it then releases RNA, its genetic material, and it tricks your cells into making copies of the virus. At this stage your cells actually become like a factory producing thousands of viruses without even realizing it. So at initial stage when the virus is replicating, one do not actually have any symptoms yet and this stage is actually called incubation period. This incubation period is different for lot of different viruses. But in the case of SARS-CoV-2 the incubation period is probably four days. In these four days you have been infected and you do not have symptoms yet. As the virus was spreading, doctors in China started seeing more and more Pneumonia and one doctor in particular, Dr. Lee Wen Liang, became concerned when he saw 7 viral illnesses that reminded him of the SARS outbreak in 2002. During this period the number of cases continued to grow and on January 9th China central television officially announced that there was a new corona virus. At this point there were at least 50 people with Pneumonia and the first fatality, a 61-year old man passed away. To complicate things Wuhan became a major hub for travel in China and it was less than 2 weeks away from Chinese New Year's, when there is lot of travel and this huge celebration. At the end of January Wuhan was officially in quarantine. But unfortunately about 20 people had already passed away from the virus. New cases of SARS-COV-2 seem increasing in different countries as shown in **Figure 1**. It was sweeping the world and the World Health Organization labeled this outbreak a pandemic.

Figure 1: Rising Cases of Covid-19 [https://covid19.who.int/]

3. Symptoms

Clinical demonstration of covid-19 immensely is like viral pneumonia like in SARS and MERS **[2]**. Most common symptoms are fever, sore throat, cough, breath shortening. 88% people had fever but if anybody does not have fever, it does not guarantee that you do not have corona virus. Less common symptoms are nausea, vomiting, diarrhea in about 3-5% people. In most severe symptoms what they develop is something called acute respiratory distress syndrome or ARDS. In ARDS the lungs develop so much inflammation and damage that it becomes difficult to get oxygen out of the air through the lungs and into the red blood cells. There are actually lot of things that cause ARDS, things like sepsis or pneumonia, even pancreatitis. So such patients are treated in the ICU's, which requires intubation, so a tube down the throat for lots of oxygen. SARS-CoV-2 is respiratory illness because for utmost patients the virus actually begins and ends with lungs. The virus encroach the lungs in its initial phase of infection and the patient feels tired. Eventually it starts contaminate the cilia, the minute hair like extensions that found in lungs with basic functionality of maintaining the airways clean from grime and mucus. But when virus grasps the lung, the cells start dying and shutoff adding the grime and obstructing the human body's intelligence to retain grime outside the lungs. This tenderness gets destruction and this destruction keeps on more tenderness there and this process iterates until there is no healthy cell remains. That is why tenderness is the root cause of dry cough and dyspnoea, which are the major signs of Corona virus disease. Seriously ill patients may exhibits pneumonia ranging from minor to frightful. Such Seriously ill patient's recuperation period may vary from few days to weeks and even month also. SARS-CoV-2 leads to acute respiratory distress syndrome that occurs when the lungs are hit by excessive fluids. In that case tenderness triggers the immune cell system and ultimately causes infection. It then proceeds to kill everything including

healthy cells even into their path, at this stage lung condition becomes more serious and sooner or later organ failure occurs. At this critical point of time supplemental oxygen and mechanical ventilations are the only ways to supply oxygen to lungs but if it fails to do that, lungs becomes unable to supply oxygen into bloodstream. As a result corona virus patient dies and it usually takes 14 to 19 days as analysis shows. **Figure 2** shows number of confirmed and death cases across the world. It does not matter what age you are, you can catch corona virus. An epidemiological through check detail disclosed that the people who are most severely affected are the elderly **[3]** and those who have underlying health conditions like heart disease, lung disease, immune suppression, diabetes. Those people go on to get a worse version of the disease. So put some real numbers on that, in China about 78% of cases were people aged 30 to 69 and of those people about 20% of them had severe illness. So it is definitely not just the elderly that are affected, but they are the ones who tend to have higher fatality rates. In the US it is seen that 8 out of 10 people that have passed away are over the age of 65 and in even higher proportion if anyone over the age of 85. Till now there is no vaccination for corona virus disease so the only way out to avoid getting infected.

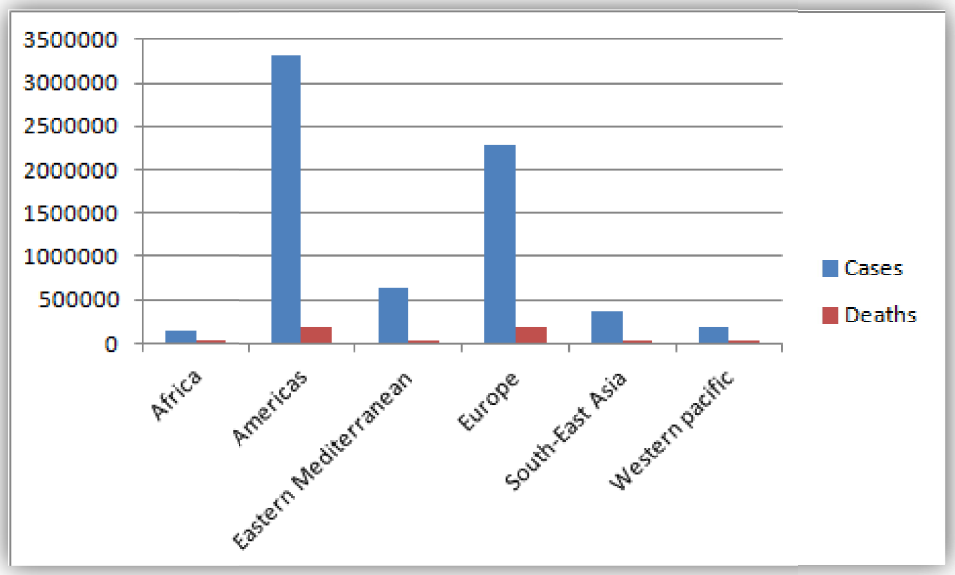

Figure 2: Number of Confirmed and Death cases [https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports]

4. Transmission

Covid-19 is a concern because it is highly transmissible as it is respiratory virus. With each replicative cycle of corona virus, a large number of particles of corona viruses are released into alveolar sac of the patient. From there these are ready to infect other human beings. It is speculated that corona virus transmitted through alveolar droplets emanating, so when infected patient coughs or sneezes the brono alveolar fluid gets mixed with these virus particles and aerosols (flying solutions) may form **[4]**. They may enter into respiratory system of another normal person and it may cause infection in that normal person. The other route is due to these aerosols when fall onto other objects like towel, plastic body, metal body and other inanimate objects. They will contaminate those objects so when another person will use or touch that object, he gets infected with corona virus disease. Also the close contact with a patient of corona virus disease may increase the chance of corona virus infection.

5. Clinical Characteristics

An observational study at Tazhou Public Health Medical Center, Zhejiang, China was performed from January 1 2020 to March 11 2020. In this observation clinical data of 145 patients infected with Covid-19 disease was gathered **[5]**. Outputs of critically ill patients and non-critically ill patients were compared. Among 145 patients, the average age was 47.5 years old and 54.5% were mem. Hypertension was utmost comorbidity 15.2%, followed by diabetes 9.7%. Common signs comprised dry cough 81.4%, fever 75.2%, anorexia 42.8%, fatigue 40.7%, chest tightness 32.4%, diarrhea 26.9% and dizziness 20%. **Table 1** shows the analyzed symptoms of patients with COVID-19.

6. Diagnosis

Upon Computed Tomography scan of SARS-CoV-2, resulted into normal to peculiar image findings, such images imbricate with other Pneumonia and respiratory illnesses. Therefore, it is difficult to make a specific diagnosis. Still there are few tests to ratify the diagnosis viz. RT-PCR (Reverse Transcription Polymerase Chain Reaction). In RT-PCR teat small amount of RNA can be detected. Severe acute respiratory syndrome (SARS) could also be detected with the help of same test. However, it is notable that RT-PCR testing may often miss the infection at the onset of the disease. RT-PCT Therefore, for the detection of viral pneumonia, chest CT can be performed **[6]**. Another test is Isothermal Amplification, also used to detect viral RNA. There is rapid serological testing also, used to tests antibodies generate by the immune system to provide resistance to virus

and toxins. Earlier infections can also be detected with this testing method even if the virus does no longer exist in the body. Viral tests and antibody tests used to detect current or previous kinds of infection. Rapid testing's also available viz. respiratory viral panel or quick flu test, they quickly gives qualitative results either negative or positive.

7. Treatment

Person possessing the benign signs of illness can be treated at home by consuming liquids that strengthens the immune system like immunity supplements that includes garlic ginger, Basel leaves, lemon etc. Weak immune system is more vulnerable to SARS-CoV-2 as compared to stronger one. Presently there is no vaccination or specific anti viral drug to cure patients suffering critically from covid-19. These critically ill patients have to give supportive care like ventilation, oxygenation etc **[7]**. Studies shows that Remdesivir an anti viral drug previously used against Ebola can help shorten the duration of symptoms though without significantly improving recovery time. However a randomized control trial in Hubei did not show statistically significant benefits of Remdesivir. On March 22, 2020 the WHO launched a global mega trial to test some of these promising medications and on May 1, 2020 the US Food and Drug Administration or FDA approved the emergency use of Remdesivir for those hospitalized with severe symptoms. However this does not equal formal approval which would require a higher level of review. Small portion of systematic corticosteroids and anti viral drugs and decomposition consumption of interferon have been aided for the treatment of covid-19 **[8]**. Other stated remedial agents that can be considered for the treatment of seriously ill patients have been mentioned in **Table 2**. Although many countries are using their old drugs for treating the less critically ill patients like in India the ICMR (Indian Council of Medical Research), under the Ministry of Health and Family Welfare, has suggested chemoprophylaxis with hydroxychloroquine (400 mg twice on day 1, then 400 mg once a week thereafter) for asymptomatic health care providers treating patients with suspected or confirmed COVID-19 cases. Generally it is safe to consume hydroxychloroquine on doctor's prescription although there is no definite confirmation of its benefit. The drug hzVSF v13 (humanized Virus Suppressing Factor; VSF), has now been used in four hospitals for the virus which is given by South Korean company Immune Med. In Italy a drug for rheumatoid arthritis appeared to help improve lung

function in hospitalized Covid-19 patients. Convalescent Plasma Therapy is preliminary process for COVID-19 patients. In this process, plasma from a Covid-19 patient who has recovered from the disease is transfused into a corona virus patient who is in critical condition. The main concept of this treatment is that immunity can be moved from a healthy person to a diseased patient using convalescent plasma. But all these treatments or plasma therapies are temporary for novel corona virus. The search for effective treatment is in pipeline with multiple investigations ongoing across the world and it is estimated that they will be available in 2021.

8. Prevention

There are many preventive measures that WHO consultants and other health care's suggest like immunity boost up, social distancing to prevent spread of covid-19 virus, hygiene like washing hands for at least 20 seconds after regular intervals, sanitization of hands, metal surfaces, plastic bodies, wearing masks, ban on exit of children and old people from home and promotion of general health **[11]**. Prevention at workplaces mainly includes adopt flexible working hours, wear a mask when taking public transport, check body temperature while entering office buildings, avoid crowded lifts as far as possible, avoid joining large scale meetings, reduce face to face contacts with co-workers, arrange flexible meal hours and avoid meal gatherings, wash hands frequently and maintain good environmental hygiene at the workplace. Prevention for frontline health care workers' safety is predominant. Governments are proving personnel protection equipments kits (PPE), medical masks, gowns and eye protection must be prepared for health care workers and others like police and sanitation inspectors. From analysis it is found that people who are physically fit are less susceptible to epidemic disease as compared to those who are having ailments like diabetes, hypertension, cardio vascular problems etc. It is advisable for the people to stay at homes where the spread of disease is on peak, also there should not be too low temperatures at places. Governments across the world are giving extensive stress on sanitization of surroundings during covid-19 pandemic, in order to keep the air and places free of contaminants.

Table 1: Symptoms of Covid-19 Pandemic

S. No.	Syndromes	Non -Inmate Patients (n=102)	Inmate Patients (n=43)	References
1.	Dry Cough	80 (78.4%)	38 (88.4%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020)
2.	Fever	70 (68.6%)	39 (90.7%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
3.	Malnutrition	36 (35.3%)	26 (60.5%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
4.	drowsiness	38 (37.3%)	21 (48.8%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
5.	Angina Pain	21 (20.6%)	26 (60.5%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
6.	Dysentery	23 (22.5%)	16 (37.2%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
7.	Faintness	23 (22.5%)	6 (14%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
8.	Referents	20 (19.6%)	8 (18.6%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
9.	Cold	14 (13.7%)	10 (23.3%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
10.	Dilemma	16 (15.7%)	8 (18.6%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
11.	Myopic	13 (12.7%)	7 (16.3%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
12.	Stomac pain	6 (5.9%)	2 (4.7%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
13.	Regurgiate	3 (2.9%)	3 (7.0%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
14.	Hypernea	0 (0%)	3(7.0%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
15.	Hypoacusis	2 (2.0%)	0 (0%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
16.	Time limit for fever (days)	4 (2,6)	6 (4,8)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
17.	No abnormal Signs on initial presentation	12 (11.8%)	0 (0%)	Chen, Qingqing, *et al*. Taizhou, Zhejiang,China." Infection (2020
18.	Symptom to hospital admission,	5 (3,9)	6 (3,10)	Chen, Qingqing, *et al*. Taizhou, Zhejiang, China." Infection (2020

Table 2: Prospective Medicinal Regimen Claims for Covid-19

S. No	Level	Potential treatment options	Reference
1.	Anteriorly	> 85% of patients received anti-viral agents, including oseltamivir (75 mg every 12 hour orally), ganciclovir (0.25 g every 12 hour intensely), and lopinavir/ritonavir tablets (400/100 mg twice daily). Remdesivir is presently under trials at more than ten medical institutions in Wuhan and has been known to avoid MERS-CoV.	Liu,Yong, Jinxiu Li, andYongwn Feng.(2020)
2.	Untimely	An old anti-malarial, chloroquine phosphate, has been productive in preventing the exacerbation of pneumonia due to its anti-viral and anti-inflammatory actions.	Gao,Jianjun, Zhenxue Tian, and Xu Yang.(2020)
3.	Verdant treatments	There was extensive use of conventional Chinese Medicine during the last SARS-COV outbreak and it is presently being used in China. The five most generally used herbs were Astragali Radix (Huangqi), Glycyrrhizae Radix Et Rhizoma (Gancao), SaposhnikoviaeRadix (Fangfeng), Atractylodis Macrocephalae Rhizoma (Baizhu), and Lonicerae Japonicae Flo.	Luo, Hui, *et al*.(2019)

9. CONCLUSION

It is probably chance that epidemics will continue to happen, and with exposure of new organisms, may be more hostile than ever. Hence from the basic know-how of current pandemic Covid-19 and previous two pandemics viz. SARS and MERS can help public health authorities for future alertness so that this danger can be defeated more accurately and new more effective practices of infection control can be developed that are accessible to the maximum of the population.

REFERENCES

[1] Lai, C. C., Shih, T. P., Ko, W. C., Tang, H. J., & Hsueh, P. R. (2020). Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and corona virus disease-2019 (COVID-19): the epidemic and the challenges. International journal of antimicrobial agents, 105924.

[2] Xie, M., & Chen, Q. (2020). Insight into 2019 novel coronavirus—an updated intrim review and lessons from SARS-CoV and MERS-CoV. International Journal of Infectious Diseases.

[3] Wang, L. S., Wang, Y. R., Ye, D. W., & Liu, Q. Q. (2020). A review of the 2019 Novel Coronavirus (COVID-19) based on current evidence. International journal of antimicrobial agents, 105948.

[4] Holstein, B. (2020). Coronavirus 101. The Journal for Nurse Practitioners.

[5] Chen, Q., Zheng, Z., Zhang, C., Zhang, X., Wu, H., Wang, J., ... & Zheng, C. (2020). Clinical characteristics of 145 patients with corona virus disease 2019 (COVID-19) in Taizhou, Zhejiang, China. Infection, 1-9.

[6] Luo, L., Luo, Z., Jia, Y., Zhou, C., He, J., Lyu, J., & Shen, X. (2020). CT differential diagnosis of COVID-19 and non-COVID-19 in symptomatic suspects: a practical scoring method. BMC Pulmonary Medicine, 20, 1-9.

[7] Keith, P., Day, M., Perkins, L., Moyer, L., Hewitt, K., & Wells, A. (2020). A novel treatment approach to the novel coronavirus: an argument for the use of therapeutic plasma exchange for fulminant COVID-19.

[8] Liu, Y., Li, J., & Feng, Y. (2020). Critical care response to a hospital outbreak of the 2019-nCoV infection in Shenzhen, China.

[9] Gao, J., Tian, Z., & Yang, X. (2020). Breakthrough: Chloroquine phos-

phate has shown apparent efficacy in treatment of COVID-19 associated pneumonia in clinical studies. Bioscience trends.

[10] Luo, H., Tang, Q. L., Shang, Y. X., Liang, S. B., Yang, M., Robinson, N., & Liu, J. P. (2020). Can Chinese medicine be used for prevention of corona virus disease 2019 (COVID-19)? A review of historical classics, research evidence and current prevention programs. Chinese Journal of integrative medicine, 1-8.

[11] Nikhat, S., & Fazil, M. (2020). Overview of Covid-19; its prevention and management in the light of Unani medicine. Science of The Total Environment, 138859.