

SARS-CoV-2 Novel Coronavirus: It's Impact and Global Health Concerns

Ashritha Singla*¹ and Tajindar Singh²

^{1,2}Punjabi University, India

¹mypublicationswork@gmail.com

Abstract— COVID-19, the disease caused by SARS-CoV-2, is dangerous and highly contagious disease. Global public health emergency has been declared by the World Health Organisation. This outbreak has caused significant threats to health and economy internationally. Currently, research on SARS-CoV-2 has been going on for vaccine. This virus first originated in China and had a rapid spread to other countries. Severe Acute Respiratory Syndrome (SARS), which has caused pandemic in 2002 has resemblance to nCoV-2019, and we will discuss about that in this paper. WHO has taken many measures to control the propagation of the virus, as a part of it, WHO-established Health Emergency of International Concern (PHEIC), with objectives for public health and impact on global health and economy .

Keywords— COVID-19, Coronavirus, pandemic.

1. INTRODUCTION

Over the last few decades, three types of coronaviruses with different geometric characteristics have emerged. In 2003, SARS caused by new coronavirus SARS-CoV caused global health concern. This SARS-CoV outbreak was first started in China back in 2002 and has spread worldwide rapidly. It has spread due to international travels, causing 8700 cases and 744 deaths in 33 countries on 5 continents [3]. This transmission of SARS-CoV started from bats, and passed into some intermediate guest, mainly person to person through direct contact. The high probability of transmitting the disease is due to unwashed hands, touching contaminated surfaces and air travel. [4] The disease due to SARS-CoV had a mortality rate of 10%, and 50% in the elderly, which is a relatively high rate compared to other viral diseases. In 21st century, the SARS outbreak was the first pandemic to break in. Research efforts towards understanding the molecular biology of the infection and pathogenesis of the disease ha been focused due to the severity of the illness associated with SARS-CoV. Efforts of WHO to collaborate globally to control SARS were affective. Most of the patients who are infected with SARS-CoV had severe illness of lower respiratory tract. Human angiotensin-converting enzyme (ACE-2) is attacked by SARS-CoV, which is a metallopeptidase expressed in numerous tissues and is mostly distributed in ciliated bronchial epithelial cells

[4,5]. The major induction of neutralising antibodies is the S protein of SARS-Cov located on the outer envelope [6,7]. Lung injury is caused during SARS by s protein being bonded to ACE-2 and its downregulation of the receptor [8,9]. Pneumonia along with rapid respiratory deterioration can also be caused by SARS due to increase in levels of activated proinflammatory cytokines [4].

MIDDLE EAST RESPIRATORY SYNDROME

MERS-CoV first emerged in Saudi Arabia in 2012, June [10]. This virus is transmitted to humans from infected camels as intermediate hosts through contact. It is also believed in way past that it might have originated from bats and transmitted to camels [10,11]. β -CoVs are the group that MERS virus belongs to and use dipeptidyl peptidase as the receptor to enter the host cell [12]. MERS Cov with an incubation period of 2 to 13 days spread from an infected person respiratory secretion to others. MERS-CoV can spread through surfaces and by touch nose, eyes, or mouth. A total number of 2494 cases, and 858 deaths have been reported as of Nov 30,2019 in 26 countries. The most number of 2102 cases were seen in Saudi Arabia, with a fatality rate of 37.1% [16]. The calculated RO of MERS-CoV outbreak in South Korea and Saudi Arabia were between 2 and 5, which means that each person with Mers-CoV infects 2 to 5 other people [17]. The mortality rate was high for older age, male sex and underlying medical conditions for MERS. Some of the medical conditions were Cardiac disease, respiratory, chronic kidney, cancer, hypertension [18,19].

Severe Acute Respiratory Syndrome Coronavirus 2, Causing COVID-19. In Dec- 2019, a place in China, called Wuhan became the centre of an outbreak of pneumonia, and the reason was unknown at that point, which has raised attention in China along with other countries.

Health China's authorities conducted an investigation to identify and control the disease by isolating people who are suspected to have the disease, closely mongering contacts of those infected people, clinical and epidemiological data collection from patients, developing procedures for diagnosis and treatment. By Jan 2020, scientists in China could isolate infected people from others. However, the virus spread rapidly to

all the counties, and around 9 cases were reported in Singapore, Vietnam, USA, Korea, Japan, and Thailand and it has the capability of air travel. SARS-CoV-2 belong to the β -CoVs group and has 82% with human SARS-CoV, and 89% nucleotide identity similar to SARS-CoV that uses ACE-2 as the receptor to enter host cell [20,21]. SARS-CoV -2 is less similar to MERS [28]. Sars-CoV-2 infection caused respiratory illness with many clinical, radiologic problems similar to SARS-CoV in 2003 [20].

Similar to the SARS-CoV transmission happens from person to person via respiratory droplets, physical contact [20,23]. As of Nov,2020 there are 5.2M cases and 1.28m deaths worldwide. SARS-CoV-2 primarily affects adults with a little number of cases in children with 15 years or younger [23,24,25].

The primary symptoms of COVID-19 are cough, shortness of breath and fever. Less common symptoms are malaise, nasal congestion, anorexia, and headache, which may appear 2 days or 14 days after exposure [26]. It affects more to the people who have cardiac issues [22]. In USA, diagnosis is currently being done using lower and upper respiratory specimens.

COMORBIDITIES IN PATIENTS WITH COVID-19

In 44672 patients confirmed with COVID-19 from China, the number also includes cases with mild symptoms, it was observed that 4.2% had cardiovascular disease, and 12.8% had hypertension. Among this total number of cases, it was reported that 80.9% had no mortality and their case was mild, 13.8% had severe disease with zero mortality, and 4. &% of the patients had critical disease with fatality rate of 48% [29].

The mortality rate was reported to be high in older age people with fatality rate of 1.3% in patients aged between 50 & 59 years, and 3.6% in patients aged from 60-69 years, & 14.8% in patients aged over 80 years old. The fatality rate in patients with diabetes was 7.3% & with hypertension was 6% [29]. The fatality rate was seen higher in men than in women which is 3.6% vs 1.6%.

In another study with a cohort size of 10 people affected with COVID-19 [31], 67% of them were men with a mean age 55.5 years, 40% of the patients had cardiovascular disease [30].

In another study of cohort size 41 patients admitted to hospital 32% of the people had underlying diseases, including cardiovascular disease 15%, diabetes, 20% The most COVID-19 related complications were viremia 15% of the population had it, 29% had ARDS, secondary infection for 10% of the people [32].

CONCLUSIONS

COVID-19, which has started as epidemic in China, and did spread to other countries quickly, it has been now officially declared by WHO as pandemic on March ,2020. This new pandemic prompts some considerations which is considered a global health emergency. Initially, from SARS to SARS-CoV-2 spreading world has caused the worst situations. China did not alert citizens even though researchers warned about pandemic situations in DEC 2019. This delayed implementation of underlying strategies that could have reduced this widespread. Another factor is, Animal health surveillance system also plays a crucial role in anticipating and detecting possible outbreaks of virus, should be integrated with human public health surveillance system. Somewhere the main reason behind the virus would be human activity. Examples are altering the natural ecosystem and deforestation that offers shelter to wildlife, deprives viruses of their natural hosts, thus providing the basis for infecting humans with new viruses [33]. Blaming civets or bats is of no use and only serves to camouflage the reasons for the global health emergency. Since the first occurrence of SARS virus, which is in 2003, questions have been raised about how the pathogens evolve and what will make the infection mild or sever [34]. Due to the new pandemic caused by SARS-CoV-2 has brought the fear and panic among us and made us realise that the history of zoonotic diseases will continue to repeat itself over time [35]. To stop the spread Beijing government had temporarily banned trading in wild animals. Even back in 2003, similar measure was implemented but all went to normal after pandemic has reduced. An ongoing surveillance if birds and mammals will be essential to get a better understanding and to avoid transmission of viruses from animals to humans. So far there is no vaccine for SARS and MERS, although studies are still going on [36]. An also there are no proven therapies against this virus COVID-19 although agents were used during MERS and SARS. Although there are no specific anti-SARS-CoV-2 treatments, because of the absence of evidence, clinical trials are examining existing anti-viral drugs to identify those that could be an effective treatment against COVID-19 [37].

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