

## COVID-19 and its Spread

MUHAMMAD SALEEM

College of Bioscience and Biotechnology  
Yangzhou University, Yangzhou, Jiangsu, China

MUNIR AHMED

College of Food Science and Engineering  
Yangzhou University, Yangzhou, Jiangsu, China

AAMIR ALI ABRO

State Key Laboratory of Cotton  
Biology Institute of Cotton Research Institute  
Chinese Academy of Agriculture Sciences Anyang (CAAS), PR China

GANG CHEN<sup>1</sup>

College of Bioscience and Biotechnology  
Yangzhou University, Yangzhou, Jiangsu, China

### Abstract

*The deadly COVID-19 caused by SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus-2) emerged in December 2019. Although the origin of COVID-19 is still a controversial subject of many speculations, this global pandemic has posed a major threat to the public health throughout the world because of its rapid spread and resulted into global health emergency. This newly identified SARS-CoV-2 is causing a large number of deaths with millions of confirmed cases throughout the world which is posing a serious threat to public health. After the declaration of COVID-19 as a pandemic by World Health Organization (WHO), We thought it necessary to provide the most up-to-date informations to increase our understandings about it. Our aim is to give a bird's eye view about the pandemic caused by SARS-CoV-2. Since researchers have made significant progress in understanding this new virus and knowledge is evolving rapidly with every passing day, readers are urged to update themselves regularly.*

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<sup>1</sup> Corresponding author: chengang@yzu.edu.cn

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## 1. INTRODUCTION

Three coronaviruses have caused large scale pandemic over the last two decades<sup>1</sup>. In 2002 and 2012, the severe acute respiratory syndrome coronavirus (SARS-CoV) and middle east respiratory syndrome (MERS) emerged respectively. SARS-CoV and MERS caused severe respiratory diseases in humans<sup>2</sup>. Recently another type of coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged in December 2019. This newly emerged SARS-CoV-2 has posed a global health threat<sup>3</sup> after its initial cases reported in Wuhan due to its fast spreading ability<sup>4</sup>. Although the fatality rate of COVID-19 is lower i.e 2% - 3%<sup>5</sup> as compared to SARS-CoV and MERS i.e 10% and 34% respectively<sup>6</sup> but it is far more severe<sup>5</sup> and has very high spreading ability. The first fatal case was reported on 11<sup>th</sup> Jan 2020<sup>7</sup>. Although there is a great dispute regarding the origin of COVID-19, the primary cluster of reported patients were found to be connected with Huanan South China Seafood Market in Wuhan<sup>8</sup>. Due to the great spreading potential of COVID-19, WHO declared a global health emergency on 31<sup>st</sup> Jan 2020 followed by declaring it a pandemic on 11<sup>th</sup> March 2020<sup>9</sup>. On 11<sup>th</sup> Feb 2020, Novel coronavirus or 2019-nCoV was officially renamed as COVID-19 and the virus causing COVID-19 was named as severe acute respiratory syndrome coronavirus 2 or SARS-CoV-2<sup>10</sup>.

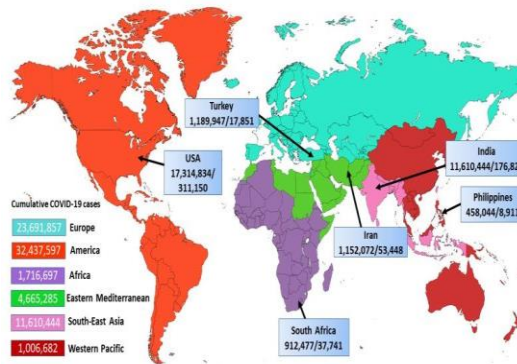
In COVID-19 infection, the virus particles begin to spread through the respiratory tract and infect the surrounding uninfected cells<sup>11</sup>. The most common symptoms of COVID-19 are fever, dry cough and tiredness while less common symptoms are headache, loss of taste and smell, sore throat, diarrhea, aches and pain etc. Difficulty in breathing or shortness of breath, chest pain or pressure and loss of speech and movement are among the most serious symptoms of COVID-19. About 80% of patients are with mild symptoms or asymptomatic, 15% are severe who need oxygen and 5% are critical who need ventilation<sup>12,13</sup>. The incubation period is 2-14 days between infection and symptom onset<sup>14</sup>.

The world is in the situation of quarantine due to this deadly virus which is showing following serious consequences;

- i. Significant economic losses due to sudden interruption of global trad and supply chains<sup>15</sup>.
- ii. “Great Recession” due to financial crisis<sup>16</sup>.
- iii. Loss of jobs due to down of industries has destabilized individuals and families.
- iv. Bad impacts in all forms of education globally. Many countries are utilizing the online mode of teaching<sup>17</sup>. However many countries are facing problems because of lack of facilities and poverty.
- v. Last but not least, negative impacts on future generations due to social distancing.

## **2. MODE OF TRANSMISSION AND GLOBAL SPREAD**

Although the analysis of initial cluster of patients showed a common exposure point i.e seafood market in Wuhan, the possible origin of SARS-CoV-2 and first mode of disease transmission are not yet identified<sup>18</sup>. According to recent studies, the virus has the ability of jumping between species<sup>19</sup>. The animal-human interface is suspected as the primary source of COVID-19<sup>20</sup>. The increase in number of cases in those people who did not have any exposure to Huanan South China Seafood market in Wuhan and health care workers suggested human-to-human transmission<sup>21</sup>. COVID-19 cases in people with no travel history to China suggested local human-to-human transmission of virus<sup>22</sup>. Wild animal hosts and infected patients are currently the main sources of disease<sup>23</sup> which is transmitted through large droplets generated during coughing and sneezing<sup>24</sup>. These infected droplets can spread 1-2 meters. Infection is acquired either by inhalation of these droplets or touching surfaces contaminated by them and then touching the nose, mouth and eyes<sup>7</sup>. Transmission of virus from asymptomatic patients is of serious concern which highly added the difficulty in controlling the virus. Although COVID-19 has zoonotic origin followed by human-to-human transmission, the possibility of other routes such as blood transfusion, trans-placental and perinatal cannot be ruled out<sup>25</sup>.



**Figure 1:** World map depicting the current scenario of COVID-19. Shown are confirmed cases of SARS-CoV-2 of countries and territories as of 20 December 2020. Different colors indicate different WHO designated geographical regions with the number of confirmed cases.

Although the fatality rate of COVID-19 is lower as compared to previously known CoVs, but its rate of transmission is much higher as is evident from global increase in number of cases<sup>9</sup>. China experienced most of the cases and deaths at the beginning<sup>26</sup> but over the time COVID-19 spread to other parts of the world and particularly United States, Europe, India and Brazil are its major victims now-a-days. According to WHO, till 20/12/2020 the total number of cases had gone up to more than 75,129, 306 globally with more than 1,680,794 deaths as shown in the figure 1.

### 3. CLINICAL FEATURES AND PREVENTIONS

Infection with the virus causing COVID-19 (SARS-CoV-2) is confirmed by the presence of viral RNA detected by molecular testing, usually RT-PCR. This is facilitated by availability of genome sequence of 2019-nCoV in Gene Bank<sup>27</sup>. The test is performed on nasopharyngeal swabs, oropharyngeal swabs, lower respiratory tracts samples etc. Few companies around the world have developed and many are trying to develop SARS-CoV-2 specific nucleic acid detection kits, SARS-CoV-2 nucleic acid detection kit produced by Shuoshi Biotechnology is its example<sup>28</sup>.

Many properties of virus such as non-specific features of disease, transmission from asymptomatic people, infectivity even before onset of symptoms, long incubation period, prolonged duration of illness and transmission even after clinical recovery makes prevention difficult yet the following preventions can be taken to avoid this deadly virus.

- i. Breaking the transmission cycle by washing hands, proper disposal of nasal secretions, using hand sanitizers, wearing facial masks.
- ii. By early diagnose, separation and treatment of patients because patients with infections are the major source of spread of virus<sup>29</sup>.
- iii. By strengthening the hospital capacity and proper check and balance through regular inspection<sup>30</sup>.
- iv. By avoiding going to crowded places, by restricting all kind of gatherings and by restricting non-essential travel.
- v. By keeping the public aware about the progress through media, maps and graphics<sup>31</sup>.
- vi. By maintaining a safe distance from anyone who is coughing or sneezing and by covering the mouth and nose with tissue or bent elbow while coughing or sneezing.
- vii. By avoiding again and again touching of hands to eyes, mouth or nose.
- viii. By quickly seeking medical attention in case of having fever, cough and difficulty in breathing or in case of any symptoms of COVID-19 mentioned above.
- ix. Policies must be reviewed regarding the utilization of wild animals and birds as a source of food<sup>31</sup>.
- x. COVID-19 spread can be contained by following strict quarantine protocols while traveling across the cities and across the countries<sup>11</sup>.

#### **4. CONCLUSION**

Since the emergence of this deadly pandemic scientists have made great efforts to understand the characteristics of virus for detection as well as for the development of drugs. Meanwhile, recent research has revealed critical aspects of SARS-CoV-2 biology and disease pathogenesis; other studies have focused on epidemiology, clinical features, diagnosis, management, as well as drug and vaccine

development. The clinical virology of COVID-19 has yet to be developed, and there are much to learn about the behavior of the coronavirus in the human host. However, early identification of this novel coronavirus, helped us to promptly investigate antiviral compounds and to try to develop vaccines. Here, I reviewed our current knowledge of virus regarding its transmission and its fast spread throughout the world.

Since at this time there are no approved treatments for this infection, prevention is crucial.

### **5. Declaration of Competing Interest**

I hereby declare that I don't have any conflicts of interest with publication of this manuscript.

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