

Fight against COVID-19 with technology: A review

Anil M. Khole

Department of Zoology, B. Raghunath College, Parbhani (M.S.), India

Email: kholeanilm@gmail.com

Manuscript details:

Available online on <http://www.ijlsci.in>

ISSN: 2320-964X (Online)

ISSN: 2320-7817 (Print)

Cite this article as:

Khole Anil M (2021) Fight against COVID-19 with technology: A review, *Int. J. of. Life Sciences*, Special Issue - COVID-19: 40-42.

Article published in Special Issue on "Covid-19 in India: An Inter-disciplinary perspective on the global pandemic in India.



Open Access This article is licensed under a Creative Commons

Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other thirdparty material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>

ABSTRACT

Coronavirus disease is an infectious disease also known as COVID-19 caused by a newly discovered coronavirus; it was named severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). The COVID-19 pandemic poses a global health threat and has resulted in the largest global economic crisis since the II World War. This pandemic affects different people in different ways. Most of the infected people will develop mild to moderate illness and recover without hospitalization. The most common symptoms of COVID-19 pandemic are – fever, dry cough, tiredness, headache, loss of taste or smell. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes (WHO). The older people, and those with underlying medical problems are more likely to develop serious illness. In the absence of population immunity to the disease and effective treatments, extensive lockdowns and related sanitary and social distancing measures. This paper provides advancements in the treatment measures of COVID-19 pandemic throughout the world.

Keywords: Coronavirus, Pandemic, Transmission, Respiratory

INTRODUCTION

SARS-CoV-2 is a novel strain of coronavirus that has not previously been identified in humans. It has been declared as pandemic and has infected at least 18,44,683 individuals and caused 117,021 deaths as of 14th April 2020 (Saxena, 2020). This disease is transmitted among humans via close contact with an infected individual that produces respiratory droplets. The World Health Organization (WHO) declared severe acute respiratory syndrome coronavirus-2 as a pandemic (WHO, 2020). SARS-CoV-2 might have emerged from the zoonotic cycle and rapidly spread by human-to-human transmission (Chan *et al.*, 2020). It was found that COVID-19 pandemic poses a global health threat and resulted in a global economic crisis of unprecedented nature. The urgency to find solutions to the COVID-19 health challenge and the severity of the socio-economic shock have had important effects on science technology and innovation (Caroline & Sandra, 2020). The

pandemic situation accelerates the speed to research, new technologies and innovations. It was reported that coronavirus disease (COVID-19) is a highly transmittable and pathogenic viral infection caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), which caused a global pandemic that led to a dramatic loss of human life worldwide. Studies show that the respiratory viruses have been performed since the beginning of the 20th century. Despite this, the relative importance of transmission routes of respiratory viruses is still unclear.

1. Overview of respiratory viruses

The respiratory viruses are most commonly reported from all continents as endemic or epidemic agents are influenza virus, respiratory syncytial virus, parainfluenza viruses, metapneumovirus, rhinovirus, adenoviruses, bocaviruses and coronaviruses. Viral respiratory tract infections are a leading cause of morbidity and mortality worldwide, representing an enormous economic and disease burden (WHO, 2017). Respiratory viruses are the most frequent causative agents' disease in humans, with significant impact on morbidity and mortality worldwide, mainly in children (Boncristiani & Arruda, 2009). Nearly eight human respiratory viruses circulate commonly in all age groups and are recognized as adapted to efficient person-to-person transmission. SARS-CoV has been out of circulation since 2003, and avian influenza virus H5N1 has caused limited outbreaks of human infections. Respiratory tract infections can be caused by a wide variety of viruses. Airborne transmission via droplets and aerosols enables some of these viruses to spread efficiently among humans, causing outbreaks that are difficult to control (Jasmin *et al.*, 2018). Virological studies show that respiratory diseases are one of the most common health conditions globally, and enormous but under-recognized impacts on public health. Some major causes of severe acute respiratory infection may lead to severe outcomes including hospitalization and death also.

2. COVID-19

Coronavirus is derived from the word *corona* meaning *crown* in Latin. The present novel CoV disease also known as severe acute respiratory syndrome (SARS)-CoV-2 and coronavirus disease 2019 (COVID-19) is an emerging global health threat (Fisher & Heymann, 2020). The COVID-19 epidemic started from Wuhan city of China and then rapidly spread up all over the world. Coronaviruses

are minute in size (65-125 nm in diameter) and contain a single-stranded RNA as a nucleic material, size ranging from 26 to 32kbs in length. The severe acute respiratory syndrome coronavirus (SARS-CoV), H1N1 influenza A, causes acute lung injury and acute respiratory distress syndrome (Shereen *et al.*, 2020). All coronaviruses contain specific genes ORF1 downstream regions that encode proteins for viral replication, nucleocapsid and spikes formation (Van *et al.*, 2012). SARS-CoV-2 possesses the typical coronavirus structure with spike protein and also expressed other polyproteins, nucleoproteins, and membrane proteins, such as RNA polymerase, 3-chymotrypsin-like protease, papain-like protease, helicase, glycoprotein and accessory proteins (Wu *et al.*, 2020; Zhou *et al.*, 2020).

All coronaviruses contain specific genes in ORF1 downstream regions that encode proteins for viral replication, nucleocapsid and spikes formation.

3. Transmission of COVID-19

Studies on transmission of COVID are generally have two main modes of transmission, large particle aerosols of respiratory droplets transmitted directly from person-to-person (within 1m) by coughing or sneezing, or fomites. Transmission occurs through any objects or materials infected indirectly by respiratory droplets deposited on hands or on inanimate objects and surfaces. Therefore, contact and droplet precautions are sufficient to prevent transmission in most ways. Handwashing, wearing masks and keeping social distance in public places keeps you safe. Milton *et al.*, (2007), noted that transmission of respiratory diseases like COVID among humans is thought to occur via droplets and objects or materials. Respiratory viruses spread via three different transmission routes: contact (direct or indirect), droplet and aerosol transmission (Ching *et al.*, 2007). Transmission via each of these three routes is complex and depends on many variables such as environmental factors (humidity & temp), crowding of people, and distribution through the respiratory tract. To date, some scientific publications provide initial evidence on whether the COVID-19 virus can be detected in the air and thus, some news outlets have suggested that there has been airborne transmission (WHO, 2020). Besides the predominant ways of transmission of SARS-CoV-2 (namely, contacts and large droplets) the airborne one is increasingly taken into

consideration as a result of latest research findings (Annalaura *et al.*, 2020). These initial findings need to be interpreted carefully.

CONCLUSION

Acute respiratory infections are a major global public health problem. Progress in the 20th century with the introduction of antibiotics, vaccines and antivirals, beside these there is a need for more result-oriented vaccines against *coronavirus* disease. Certain infections continue to cause frequent morbidity, and sometimes cause severe outcomes including death. The situation caused by COVID-19 is the worst in developing countries. The current practices for treating these illnesses are ineffective and often result in adverse consequences. Targeting the diseases caused by *coronavirus* (SARS-CoV) will be the key challenge of the 21st century. Now, the research tools have to develop effective modalities against respiratory viruses. The collective engagement of researchers throughout the world can find new weapons against *coronavirus*. According to WHO, we can keep ourselves protected by following some important guidelines such as – *maintaining social distance, wearing masks, avoiding crowded spaces, cleaning hands with soap or sanitizer.*

These are some important weapons against *coronavirus* during this pandemic.

Covid-19 Airborne Transmission and Its Prevention: Waiting for Evidence or Applying the Precautionary Principle?

Annalaura Carducci, Ileana Federigi * and Marco Veran

Covid-19 Airborne Transmission and Its Prevention:

Waiting for Evidence or Applying the

Precautionary Principle?

Annalaura Carducci, Ileana Federigi * and Marco Veran

Conflicts of interest: The authors stated that no conflicts of interest.

REFERENCES

Annalaura Carducci, Ileana Federigi, Marco Verani (2020) Covid-19 Airborne Transmission and Its Prevention: Waiting for Evidence of Applying the Precautionary Principle, *J. Atmosphere*, 11(710): 1-21.

Boncrisiani HF and Arruda E (2009) Respiratory Viruses, Encyclopedia of Microbiology (3rd Edi.), Academic Press.

Chan JF Yuan S, Kok KH, To KK, Chu H, Yang J Xing F, Liu J, Yip CC, Pon RW, Tsoi HW, Lo SK, Chan KH, Poon VK, Chan WM, Ip JD, Cai JP, Cheng VC, Chen H, Hui CK, Yuen KY (2020). A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *Lancet* 395(10223):514-523.

Ching P H, Li K Y, Pessoa-Silva, Seto C L, Wang WTKF (2007) Infection prevention and control of epidemic and pandemic-prone acute respiratory diseases in health care: WHO interim guidelines, WHO, Geneva, p. 90.

Caroline Paunov, Sandra Planes Satorra (2020) Science, technology and innovation in times of Covid-19 and policy responses: Preliminary overview in June 2020, Virtual workshop on Sci., Tech. and innovation in times of COVID-19, oe.cd/tip-covid19.

Fisher D, Heymann D (2020) The novel coronavirus outbreak causing COVID-19. *BMC Med*, 18:57.

Jasmin S Kutter, Monique I Spronken, Pieter L Fraaij, Ron AM Fouchier, Sander Herfst (2018) Transmission routes of respiratory viruses among humans, *Current Opinion in Virology*, 28:142-151.

Jie-Ming Qu, Bin Cao, Rong-Chang Chen. COVID-19: The Essentials of Prevention and Treatment, Shanghai Jiao Tong University Press, Pub. By Elsevier (2021).

Muhammad Adnan Shereen, Suliman Khan, Abeer Kazmi, Nadia Bashir, Rabeea Siddique (2020) COVID-19 infection: Origin, transmission, and characterization of human coronaviruses, *J. of Advanced Research*, 24:91-98.

Shailendra K Saxena. Coronavirus Disease 2019 (COVID-19): Epidemiology, Pathogenesis, Diagnosis and Therapeutics, Springer Nature, Singapore (2020).

Shailendra K. Saxena, Swatanta Kumar, Vimal K. Maurya, Raman Sharma, Himanshu R Dandu, Madan LB Bhatt (2020) Current Insight into the Novel Coronavirus Disease 2019 (COVID-19), Springer Nature, Singapore.

Van Boheemen S, de Garaf M, Laubere C, Bestebroer TM, Raj VS, Zaki AM (2012) Genomic characterization of a newly discovered coronavirus associated with acute respiratory distress syndrome in humans, *MBio*, 3(6): e00473-e512.

Wu F, Zhao S, Yu B, Chen Y M, Wang W, Song Z G (2020) A new coronavirus associated with human respiratory disease in China. *Nature*, 1-5.

WHO. Available from [http://www.who.int/en/\[cited](http://www.who.int/en/[cited) 2017 28.08.17]

Zhou P, Yang S, Wang X, Hu B, Zhang L, Zhang W (2020) A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*, 3.