



Novel Cancer Care in the Age of the Pandemic

Khushboo Choudhury¹, Deepika Tripathi^{2*}, Vishnu Chauhan³

¹ *University School of Biotechnology, Guru Gobind Singh Indraprastha*

University, New Delhi, 110078, India

^{2*} *Department of Biotechnology, Manav Rachna International Institute of Research and Studies, Faridabad,
121001, India,*

³ *University School of Basic and Applied Sciences, Guru Gobind Singh Indraprastha University, New Delhi,
110078, India*

Abstract

At the start of December 2019, the world started seeing the outspread of the novel coronavirus (COVID-19) from Wuhan, China to at least 210 countries and territories. The number of new infections around the world has been steadily increasing and current infected cases presently stand at 2.2 million with more than 100,000 deaths. This virus outbreak has affected whole populations and in particular, the cancer care delivery system. The patients those are in suffering of cancer are more getting hit by this virus because of their suppressive or weak immune system. Many strict steps have been initiated by central, state, municipal and provincial governments to detect the cases of infected patients, contact tracing, restrictions to commuting, quarantine to suspected cases, detection kit promotion, local guidance and providing information to public etc. In early stage, more attention is required by oncologist to detect the infected patients, as a stage of advance cancer is at high risk for unfavourable cases. Oncologist must confirm that the patients suffering from cancer must be at home during this pandemic. There is a paucity of information on COVID-19 spreading and its powerful effect on cancer patients and health professional. The management of the scientific guidance for cancer patients is very poor in outbreak of spreading coronavirus.

Keywords: COVID-19, pandemic, COVID-19 characteristic, cancer patients with COVID-19.

Introduction

The novel COVID-19, caused by SARS-CoV-2, first case was detected in Wuhan, China in December, 2019 [1, 2]. According to the World Health Organization (WHO), as on 17th April, 2020, at least 2.2 million infected cases detected with more than 100,000 deaths worldwide. All health care professionals have a critical prospect and a social responsibility to communicate to their patients correct and updated information regarding practices in light of coronavirus outbreaks. All countries must involve to quarantine, test, treatment and detect to control this pandemic.

Lately, the United States of America and European Union have emerged as the new epicentres to fight against this pandemic with mortality and morbidity increasing daily.

The novel Coronavirus came into global focus in December 2019 after the first outbreak was reported in Wuhan, China. World Health Organization announced it as a pandemic on March 11, 2020 [3]. The global health community assumed that outbreak could only be restricted in China because of rapid implementation of quarantine in Wuhan and stringent steps were taken to prevent the further spread in country. The transmission of this coronavirus from wildlife (SARS existed in bats before it was transmitted to humans) to humans resulted in ban on Chinese wildlife trade; hence, the fast spreading of COVID-19 showed a methodical and rapid transmission in humans [4].

Basic characteristic of COVID-19

The new novel coronavirus seems like to be very contagious and it has been spreading very fastly all over world. This virus is moving beyond the species barrier and causing the illness in humans form cold to difficulties in respiration and more severe disease. COVID-19 spreads through droplets, contaminated hands or surfaces and transmission form human to human labelled with incubation times is 2.-10 days. The deep analysis of different 22 studies signifies that human COVID-19 including Severe Acute Respiratory Syndrome coronavirus (SARS- CoV) can persist on metal, wood, paper, glass, plastic, disposable gown and Middle East Respiratory Syndrome coronavirus (MERS-CoV) can persist on steel and plastic, and endemic human coronaviruses (H-CoV) can persist on aluminium, glass and plastic as well as veterinary coronaviruses i.e. and canine coronavirus (C-CoV), transmissible gastroenteritis virus(TGEV) can persist on steel and mouse hepatitis virus (MHV) can also persist on steel. In suspension test, various type of biocidal agents supports the inactivation of COVID-19 using glutaraldehyde (GA), Povidone iodine (PI), Hydrogen peroxide (H₂O₂), Formaldehyde (HCHO), Sodium hypochlorite (NaOCl), 2-Propanol and ethanol. In carrier tests, different types of biocidal agents helps in inactivation of COVID-19 using Ethanol, Benzalkoniumchloride C₂₇H₄₂ClNO₂, NaOCl and H₂O₂ [5]. This contagious virus can persist on different surfaces for different times as shown in Table.1 The members of large family of COVID-19 can cause the problems of cold, respiration, enteric, hepatic, nerves system related disease even in animals cattle, cats, bats. The family of the viruses cause epidemic with variable clinical severity featuring respiration and over- respiration manifestations. Concerning the two main family of coronavirus, the mortality rates of (SERS- CoV is 10%) and (MERS-CoV is 35%) [6].

Table 1 Persistence of COVID-19 on different types of inanimate surfaces with different temperature and time.

Surface type	Virus	Temperature	Persistence time	References
Steel [7, 8]	MERS TGEV, MHV	20 °C 4 °C	48 hrs. ≥ 28 days	
Al [9]	H-CoV	21 °C	5 days	
Metal surface [10]	SARS	21 °C	5 days	
Wood, Glass[10]	SARS	RT	4 days	
Paper [10]	SARS	RT	4-5 days	
Plastic [11]	SARS	RT	≤ 5 days	
Polyvinyl chloride (PVC), Si rubber, Ceramic materials, Teflon [12, 13]	H-CoV	21 °C	5 days	
Disposable gown [13]	SARS	RT	2 days	

Comparison between Global and India's number of confirmed active case of coronavirus

World health Organization is providing day to day data of total coronavirus confirmed infected cases, new cases, total death, total new death, type of transmission and days since last reported cases. Here, we tabulate some data on number of confirmed cases in India in month of February, March and April. The number of confirmed cases across the world has been compared with the number of cases in Indian in April month. Significantly, the comparison has been done due to rapid growth of active cases in April month in India. Initially, WHO reported on 28 February 2020, the cause of transmission of infection in India was only the 03 imported case [14]. Later, the outbreak spreading is in view due to local transmission, community transmission and cluster of cases. In India, the overlook of number of infected cases on 30 January and 1 February 2020, there was only 1 imported confirmed case of COVID-19 [15, 16]. On 03 February 2020, 03 confirmed cases were reported [17]. Constantly, from 29 Feb. 2020 to 1 March 2020, only three cases were reported [18, 19]. Fig.1 illustrated the plot of statistical data of Feb. 2020. Further, the smooth rise in number of confirmed cases was observed in March 2020 as shown in Fig. 2. WHO reported the 29 confirm cases on 5th March and it increased to 1071 cases on 30 March 2020. The data is shown using the distribution plot and fitted with the Gaussian function. Careful observation of Fig. 2 shows the exponential rise in number of cases and increased 356 times in March as compared with 01 March 2020 [20]. Fig. 3 (b) represent distribution plot of COVID-19 active cases in April 2020 in India. From 1 April to 30 April 2020, expeditious increase in coronavirus infected patients (1636 to 33050) was observed as depicted in Fig. 3 (b) [22, 23]. Fig. 3 shows the Comparison between Global and India's number of confirmed coronavirus infected cases in April month. Gaussian fitting of the data indicates the steady and exponential increase across the world and in India respectively. The total no of patients across the world and in India are 3089733 and 33050 respectively which is 99.48 times higher than the number of patients in India on 30 April [23]. Detailed information of confirmed infected coronavirus cases can be obtained by WHO daily report [24].

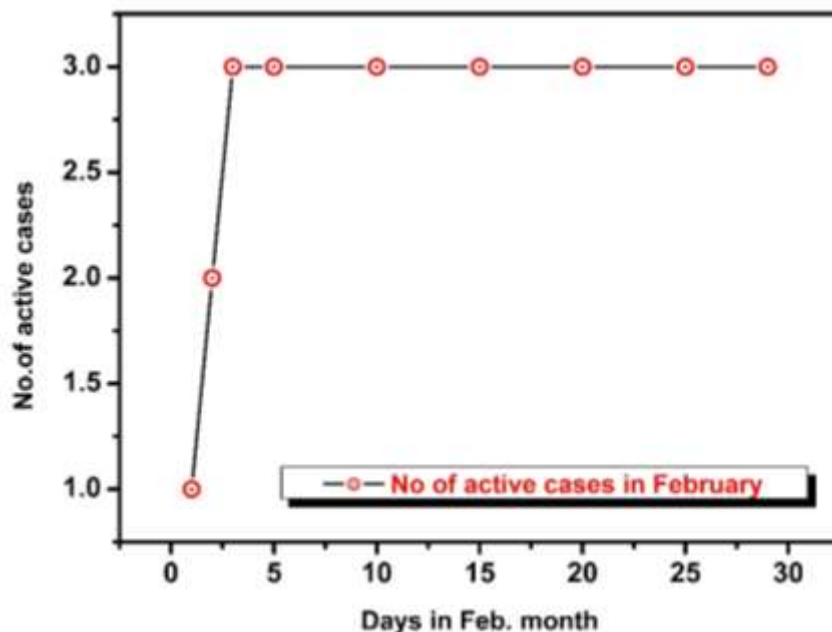


Fig. 1 shows the number of confirmed coronavirus infected cases in February month.

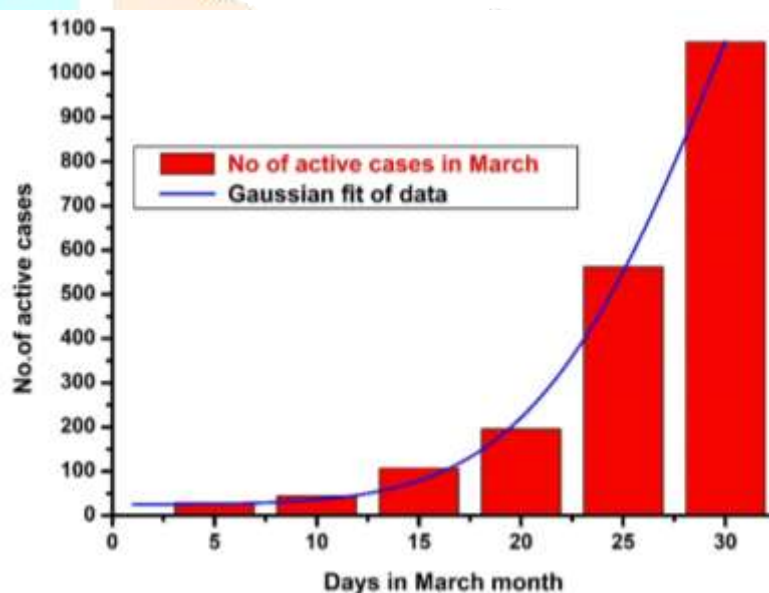


Fig. 2 shows the number of confirmed coronavirus infected cases in March 2020.

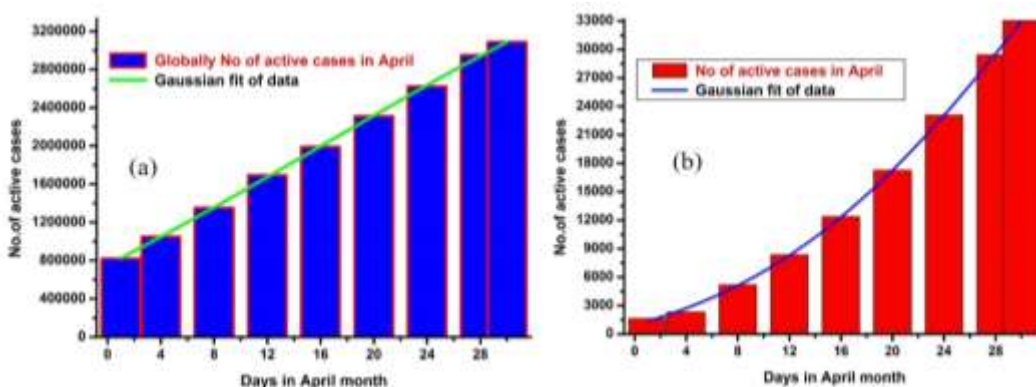


Fig. 3 Comparison between (a) Global and (b) India's number of confirmed coronavirus infected cases in April 2020.

COVID-19 with Cancer

One of the major high-risk community in this pandemic are cancer patients because of earlier susceptible to infections cause their causal illness and generally immunosuppressed state, they may increase the severe complications form this coronavirus. Upon infection by COVID-19, a patients' disease treatment would be given priority, and any cancer treatment could be delayed. The judgement regarding patient treatment with cancer have to be done on a patient-by-patient basis with keeping in mind with the risk of the disease. Media have explained that cancer patients in high risk zone cities are unable to travel for chemotherapy and they are struggling to get their essential medicines; the risk of disruption in drug supply chains and consequential shortages will worsen this concern. Due to the serious coronavirus infected patients, scheduled operations, appointments, and some other sort of cancer treatments that had to be provided on time, now have been postponed or cancelled for giving the priorities to the COVID-19 patients due to shortage of beds and healthcare goods. In England, UK, despite the 2020 budget, a promising several billion pounds of extra funding was provided by The National Health Service (NHS) to help and tackle this outbreak. When the cases of COVID-19 would have peak in coming weeks, The National Health Service certainly would be forced to delay the non-urgent treatments and operations as resources and repurposed.

Determinants of Covid-19 in Oncology

The detailed study of coronavirus will be revealed in future based on the ongoing research on it. Currently, a lot facts has to be measured and examined about his disease and its spreading. In addition, the specific information and study still has not been in news about disease of cancer and COVID -19 patients. However, a study reported by Cai Q et al. [25] recommended that a few percentage of patients showed pre-existing conditions such as diabetes, hypertension, cardiovascular and liver disease, malignancy and others with 6.4%, 12.8%, 3.7%, 2.7%, 1.4 and 3.7% respectively.

There are no guidelines have been suggested on care of cancer patients for various types of cancer such as breast and lung cancer, therapy type cancer, normal cancer patients and cancer in children and elderly. The key factor for major risk of these patients is the incapability to have essential medical facilities in a matter of getting to hospital and establishing normal medical facilities for them due to this outbreak. In a report of WHO-china mission on COVID-19, it was found that cancer patients had probably double risk of COVID-19 as compared to the common population. Patients with comorbid situation had much higher rates: cancer (7.6%), cardiovascular disease (13.2%), hypertension (8.4%), chronic respiratory (8.0%), and diabetes (8.0%) as reported [14]. Oncologists ought to be extra attentive as patients in advanced metastatic stages of cancer are approaching at much higher risk of disability or mortality, if they come in contact with this novel coronavirus. It can be helpful for oncologist to detect the patients of poor prognosis at earlier stage those are at high risk factor of older, comorbidities and with smoking habits [26].

Recently due to the rapid spread of this pandemic, conference and meetings on cancer have been cancelled or postponed and upcoming meetings may be expected to follow. This is also as a result of government policies in various countries banning all domestic and international. Consequently, various future prospects for needful discussion and collaboration would be gone and the research on it would not be presented. Therefore, the dissemination of information would be delayed that would directly affect the patients. Even though some committees

are reorganised for online discussion and some face to face meetings cannot be absolutely eliminated because they are the vital part of team science. The deferring or cancellation of meetings and discussion would face the financial problems and this could raise the long term effect on their capabilities to fund key activities in future prospects. The American Society of Clinical Oncology (ASCO) had not yet fixed their annual meeting 2020 which relied on huge amount US\$43 million in revenue from education and registration charges in 2018. The smaller societies and scientific communities that are based on their annual meetings financially, the postponed and cancellation could abolish their existence. With observing the continuously changing situation, we all only can watch, wait or adapt the best we think until the influence of this pandemic completely materialise. Till the time the world is declared pandemic free, we can hope to hold meetings and workshops through the virtual space. Until this pandemic is ended, we can only have hopefulness that the concerns are not much distressing for all specially for patients and even oncology communities are beyond the reach of this extraordinary storm. Looking to the daily increase in COVID-19 cases, the associated mortality has been enforced for lockdown in various countries to detect the spreading of this virus. USA currently has the highest number of cases standing at 855,301 with 48,483 deaths. Spain follows the USA with 213,024 current infections with 22,157 deaths. In third place on this macabre list is Italy with 189,973 current infections and 25,549 deaths.

Myths and Facts

Information disseminated through social media about this pandemic, infection its prevention and treatment is not validated by any scientific proof. World health organization has reported an advisory for spreading the myths and deception about this pandemic [27]. Health care workers in critical cancer care as well as palliative cancer care, now have a responsibility towards their patients to disseminate all the correct and ongoing information regarding practice modifications in assessment of this outbreak. We have tabulated some of the current myths floating around as well as the correct fact accompanying that myth.

Myths/Misinformation	Facts
Only older people are in influence of this coronavirus	People with age >60 years those having symptoms of diabetes, weak immune system, heart problem are more suspected but young people can also get infection.
Coronavirus is transmitted by mosquito bites	No evidence has been found to prove the transmission by mosquitoes.
Spraying alcohol or chlorine kills the coronavirus	These are the disinfectants, spraying these on human body would not kill coronavirus.
This fatal virus cannot exist in snow and cold weather	No evidence has been found that suggests that coronavirus can't exist in cold weather. This can be transmitted in all areas: hot, cold, snowy and even in humid areas.

Eating garlic prevents the coronavirus infection	Garlic is rich in antimicrobial properties, but no evidence has been found that suggest garlic can prevent this coronavirus infection.
More water intake can flushes out this virus.	No scientific evidence has proved that supports more water intake can support individuals to flush out this virus.
A bathe with hot water prevents the coronavirus infection	Taking a hot bath cannot prevent this virus infection.
Hand Dryers can kill the coronavirus	Hand dryers are not effective in killing COVID-19.
Ultraviolet (UV) lamp radiations can minimize or reduced the surface contamination with COVID-19.	UV lamp radiations must be ignored to disinfect hands or other areas of skin as it may cause skin disease.
Thermal Scanning can help in detecting the coronavirus.	Thermal scanning are effective in knowing the skin temperature only, not for detection of coronavirus.
Cow Urine can flush out the COVID-19.	No scientific evidence has been found that supports intake of cow urine can help people to flush out the COVID-19.
Vaccines against pneumonia can protect from COVID-19	The pneumonia vaccines cannot protect against COVID-19.
Specific medicine use against the virus.	Still no medicine has been proven or recommended for the prevention or treatment of this virus.
Rinsing nose with saline can provide protection from the disease infection.	No research has suggested that rinsing the nose with normal saline can provide protection people from the disease infection.
Taking antibiotics can prevent the coronavirus infection	In fact, antibiotics affect only on bacteria, not against viruses. Antibiotics should be avoided for prevention or treatment of COVID-19 infection.

General Protection steps for cancer patients and cancer care professionals [28] -

- Cancer Care health professionals should follow some standard precautions in view of patients like hand and respiratory cleanness, safe and proper waste management, decontamination of sanitary and medical equipment's, etc.
- Confirm that all patients should properly cover their mouth and nose if they have coughing or sneezing problems.
- Separate quarantine arrangement for admission of suspected coronavirus cancer patients or ensure at least 1-meter distance between their beds in ward admission area.
- Cancer care professionals should take care of sanitation and they should wear clean and sterilized, protective personal equipment.
- Perform proper hand sanitation after the visit of every patient.
- COVID-19 suspected cases should be detected using thermal screening.

During this pandemic, in addition to better protection, coronavirus patients with cancer require online medical counselling and adequate identification and treatment of high risk or critical cases. In widespread areas outside India, decisions need to be made on whether or not to postpone cancer treatment on patient's risk based. By thoroughly assessing patient risk, proper care can be arranged for such patients who need immediate assistance. Delays in treatment could lead to huge problem in patients like tumour progression and ultimately poorer outcomes.

REFERENCES

1. World Health Organization (WHO) (2020, March 18). WHO Director-General's opening remarks at the media briefing on COVID-19. Retrieved from <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---18-march-2020>.
2. Centers for Disease Control and Prevention (CDC) (2020, March 21). Coronavirus disease 2019 (COVID-19) situation summary. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/summary>.
3. Coronavirus disease (COVID-19) outbreak. (2020). Accessed: March 15, 2020: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.
4. Ashour HM, Elkhatib WF, Rahman, MM, Elshabrawy HA: Insights into the recent 2019 novel Coronavirus (SARS-CoV-2) in light of past human coronavirus outbreaks. *Pathogens*. 2020, 9:186. Accessed: 03/12/2020: [10.3390/pathogens9030186](https://doi.org/10.3390/pathogens9030186)
5. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *J Hosp Infect*. 2020;104(3):246–51. Available from: <https://doi.org/10.1016/j.jhin.2020.01.022>
6. Cascella M, Rajnik M, Cuomo A, et al. Features, Evaluation and Treatment Coronavirus (COVID-19) [Updated 2020 Apr 6]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. <https://www.ncbi.nlm.nih.gov/books/NBK554776/>

7. van Doremalen N, Bushmaker T, Munster VJ. Stability of Middle East respiratory syndrome coronavirus (MERS-CoV) under different environmental conditions. *Euro Surveill* 2013;18.
8. Casanova LM, Jeon S, Rutala WA, Weber DJ, Sobsey MD. Effects of air temperature and relative humidity on coronavirus survival on surfaces. *Appl Environ Microbiol* 2010;76:2712-7.
9. Warnes SL, Little ZR, Keevil CW. Human Coronavirus 229E Remains Infectious on Common Touch Surface Materials. *MBio* 2015;6:e01697-15.
10. Duan SM, Zhao XS, Wen RF, Huang JJ, Pi GH, Zhang SX, et al. Stability of SARS coronavirus in human specimens and environment and its sensitivity to heating and UV irradiation. *Biomed Environ Sci* 2003;16:246-55.
11. Chan KH, Peiris JS, Lam SY, Poon LL, Yuen KY, Seto WH. The Effects of Temperature and Relative Humidity on the Viability of the SARS Coronavirus. *Adv Virol* 2011;734690.
12. Warnes SL, Little ZR, Keevil CW. Human Coronavirus 229E Remains Infectious on Common Touch Surface Materials. *MBio* 2015;6:e01697-15.
13. Lai MY, Cheng PK, Lim WW. Survival of severe acute respiratory syndrome coronavirus. *Clin Infect Dis* 2005;41:e67-71.
14. World Health Organization (WHO) (2020, February 28) Coronavirus disease 2019 (COVID-19) Situation Report – 39. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200228-sitrep-39-covid-19.pdf?sfvrsn=5bbf3e7d_4
15. World Health Organization (WHO) (2020, January 30). Novel Coronavirus(2019-nCoV) Situation Report – 10. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200130-sitrep-10-ncov.pdf?sfvrsn=d0b2e480_2
16. World Health Organization (WHO) (2020, February 1) Coronavirus disease 2019 (COVID-19) Situation Report – 12. Retrieved from: [who.int/docs/default-source/coronaviruse/situation-reports/20200201-sitrep-12-ncov.pdf?sfvrsn=273c5d35_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200201-sitrep-12-ncov.pdf?sfvrsn=273c5d35_2)
17. World Health Organization (WHO) (2020, February 3) Coronavirus disease 2019 (COVID-19) Situation Report – 14. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200203-sitrep-14-ncov.pdf?sfvrsn=f7347413_4
18. World Health Organization (WHO) (2020, February 29) Coronavirus disease 2019 (COVID-19) Situation Report – 40. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200229-sitrep-40-covid-19.pdf?sfvrsn=849d0665_2
19. World Health Organization (WHO) (2020, March 01) Coronavirus disease 2019 (COVID-19) Situation Report – 41. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200301-sitrep-41-covid-19.pdf?sfvrsn=6768306d_2
20. World Health Organization (WHO) (2020, March 01) Coronavirus disease 2019 (COVID-19) Situation Report – 41. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200301-sitrep-41-covid-19.pdf?sfvrsn=6768306d_2

21. World Health Organization (WHO) (2020, March 31) Coronavirus disease 2019 (COVID-19) Situation Report – 71. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200331-sitrep-71-covid-19.pdf?sfvrsn=4360e92b_8
22. World Health Organization (WHO) (2020, April 01) Coronavirus disease 2019 (COVID-19) Situation Report – 72. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200401-sitrep-72-covid-19.pdf?sfvrsn=3dd8971b_2
23. World Health Organization (WHO) (2020, April 30) Coronavirus disease 2019 (COVID-19) Situation Report – 101. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200430-sitrep-101-covid-19.pdf?sfvrsn=2ba4e093_2
24. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>
25. Cai Q, Huang D, Ou P, et al (2020). COVID-19 in a Designated Infectious Diseases Hospital Outside Hubei Province, China. Preprint. Posted online February 19, 2020. medRxiv 20024018.
26. Zhou F, Yu T, Du R, et al (2020). Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet, online 2020, March 11. DOI: [https://doi.org/10.1016/S0140-6736\(20\)30566-3](https://doi.org/10.1016/S0140-6736(20)30566-3).
27. World Health Organization (WHO) (2020). Coronavirus disease (COVID-19) advice for the public: Myth busters. Retrieved from <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters>.
28. World Health Organization (WHO) (2020, March 20). Infection prevention and control during health care when COVID-19 is suspected. Retrieved from [https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-\(ncov\)-infection-is-suspected-20200125](https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125).