

The Novel Corona Virus / COVID-19 – An Update

Dr Tanu Singhal *

Abstract

There is a new public health crisis threatening the world with the emergence of the novel corona virus-19 or COVID-19 in Wuhan, China and its subsequent global spread. It is believed to have originated in bats and transmitted to humans through yet unknown intermediary animals. The disease is transmitted through inhalation or contact with infected droplets and the usual incubation period is 5 days (range 2-14 days). The symptoms are mild in most people but 15-20% of patients (usually the elderly and those with comorbidities) may suffer from severe disease. The case fatality rate is estimated to range between 2-3%. Diagnosis is by specific molecular tests in respiratory samples. Treatment is essentially supportive. The role of antiviral agents is being explored. Prevention is by strict contact and droplet precautions in hospitals for suspected and confirmed cases. Home isolation of patients with mild illnesses is recommended.

Keywords: COVID-19, SARS-CoV-2, Pneumonia, Acute Respiratory Distress Syndrome.

Introduction

The COVID-19 pandemic is now affecting all walks of life throughout the world. Significant aspects of this public health crisis are:

The emergence of the 2019 – Novel Corona Virus⁽¹⁾ in China and subsequent spread all over the world is causing significant morbidity, mortality and damage to the world economy⁽²⁾. At the time of writing this article (10/03/2020) around 114,000 cases and 4000 deaths have been reported from China and 114 from other countries⁽³⁾. This article discusses what is currently known about the virus. One must remember that new information about this virus is emerging on a daily basis and readers are requested to update themselves regularly. The disease has been named as COVID-19 (coronavirus disease 2019) by the WHO and SARS-CoV-2 by the International Committee on Taxonomy of viruses^(4,5). The virus and the disease will be referred to as COVID-19 in this paper.

* Consultant Pediatrics and Infectious Disease
Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute
Mumbai.
Email: tanusinghal@yahoo.com, tanu.singhal@relianceada.com

History

Corona viruses are RNA viruses that commonly infect humans and animals. The name is derived from the Latin word “corona” or “crown” because of their crown like appearance of the virus under the electron microscope due to the glycoprotein spikes. Four strains of the corona virus namely HKU1, NL63, 229E, OC43 have been in circulation in humans and cause 5-10% of respiratory infections in humans; usually mild.

Additionally there have been episodes of crossover of corona viruses from animals to humans leading to severe disease in the past two decades. The first such episode happened in 2002 when the Severe Acute Respiratory Distress Syndrome (SARS) coronavirus of bat origin crossed over from the palm civet cats to humans in the Guangdong province of China. An estimated 8422 people in China and Hongkong were infected with 916 deaths (mortality rate 11%)⁽⁶⁾. One decade later in 2012, the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) of bat origin and transmitted through camels, emerged in Saudi Arabia and infected 2494 individuals with 858 deaths (mortality rate 34%)⁽⁷⁾. Fortunately both these outbreaks

were contained fairly quickly.

Origin and spread of the COVID-19^(8,9)

Adults with severe pneumonia of unknown etiology started presenting to hospitals in Wuhan, the capital city of Hubei Province of China in the first week of December 2019. This event was picked up by the surveillance system (set up following the SARS outbreak). Most of the initial cases had a common exposure to the Huanan seafood market which was also trading live animals. On 31st December the World Health Organization was informed about the outbreak. On January 1 the seafood market was closed. Genome sequencing methods were used and on 7th January 2020, the etiology of this pneumonia was identified as a new corona virus with more than 95% homology with the bat corona virus. The first death was reported on 11th Jan 2020. In the following couple of weeks the number of cases increased exponentially in Wuhan, other cities of Hubei province and other provinces in China. Patients with no contact with the seafood market were also affected indicating that human to human transmission was occurring. Soon cases in other countries (Thailand, Singapore and South Korea) were reported. Soon, there were reports of health care workers treating the patients becoming infected. The massive migration of the Chinese on occasion of the Chinese New Year fuelled the spread of the virus. On 23rd January, Wuhan, a city of around 11 million people was placed under lockdown with restriction of entry and exit into the city. Later other cities in the province were also locked. Large scale gatherings, events were cancelled and entertainment hubs were closed. While the response of the Chinese authorities was decisive, it was rather delayed. The epidemic was raging for more than a month by the time these measures were put in place. There was exit screening of people traveling out of China and screening of passengers in different countries who were arriving from China, especially the Hubei province. Symptomatic patients were isolated and tested. Contacts of patients who had tested positive were also investigated. On the 30th of January, the World Health Organization declared this outbreak as a Public Health Emergency of International Concern. As the epidemic progressed, many countries including India started evacuating their citizens from the affected area. The evacuees, even if asymptomatic were quarantined upon arrival for 14 days. Those who became symptomatic were tested.

With all these containment measures, the number of new cases and deaths in China started reducing. There was a trickling of cases in other countries but

with few fatalities. A large cruise ship docked off coast of Japan saw 700 cases. The last two weeks has however witnessed a dramatic change in the epidemiology. There is a sudden increase in cases in South Korea, Italy and Iran, France, Germany and USA. For the first time, new cases reported globally has exceeded China. Italy and Iran are witnessing a large number of deaths. There is now a lock down in Italy and travel restrictions in Iran to curb the spread of the virus. Globally, contacts of cases all over the world are being traced and quarantined. Schools have been closed, most meetings, conferences have been cancelled. Travel, tourism and business have taken a huge hit. As of 10/3/2020, 1142022 cases and 4028 deaths⁽³⁾. Of the total cases, 68,000 cases have either died or recovered while 46,000 are still active. Of the active cases, 12% are in a critical condition⁽³⁾.

India has been relatively spared till date. While February saw only 3 cases all in Kerala in students returning from China, March has seen a sudden increase. In the first week of March, 58 new cases have been reported from all over the country predominantly in those who have travelled abroad. There have been no deaths so far and most cases are mild⁽³⁾.

Though these are the official estimates, unofficial estimates and media put the numbers of those affected and dead as many fold higher. Though the COVID-19 has homology to the bat corona virus, the intermediary animal from which this virus crossed to humans is still unknown. Pangolins and snakes are the current suspects.

Epidemiology and Pathogenesis^(10,11)

The COVID-19 spreads as a droplet infection. It is believed that these are large droplets that usually travel for 1-2 meters. Infection occurs by inhalation of the droplets or through contact with contaminated surfaces and then touching of the mouth, nose or eyes. The virus may remain alive on surfaces for upto 9 days but can be destroyed readily with surface decontamination with 0.1% hypochlorite, 70% ethanol or 0.5% hydrogen peroxide in less than a minute⁽¹²⁾. There is some recent evidence that air borne transmission of the virus through small droplets may also be possible⁽¹³⁾. Patients are infectious even before they become symptomatic or even if they are asymptomatic⁽¹⁴⁾. The basic case reproduction rate (the no. of people infected by one person) in various modeling studies has been reported to range from 2-3⁽¹¹⁾. As a comparison this figure was 1.3 for influenza and 2 for SARS.

In a recently published report, one patient who

returned from a conference in Singapore acted like a superspreader and transmitted the illness to 11 other people during his stay at a ski resort in French Alps and subsequent return to the UK⁽⁹⁾. In another report two residents in a Hong Kong apartment block got infected possibly due to faulty toilet pipes⁽⁹⁾. There are reports of one person spreading the virus to hundreds of other people in a South Korean church⁽³⁾. In a recent report, no transplacental transmission of COVID-19 from nine pregnant women to their newborns was demonstrated⁽¹⁵⁾. However cases of neonatal disease due to post natal transmission have been demonstrated⁽¹⁶⁾.

The incubation period varies from 2-14 days (median 5 days). It is estimated that only 1% of the cases may manifest symptoms after 14 days⁽¹⁷⁾. The virus enters the respiratory epithelium through the angiotensin converting enzyme (ACE2) receptor. Activation of the cytokine cascade leads to lung damage⁽¹¹⁾.

Genetic studies have shown mutations in the viral genome with the progression of the epidemic. This has implications for virulence, vaccination and spread of the virus.

Clinical Features

It is now known that the viral infection may be either asymptomatic or cause very mild symptoms. The virus can affect people of any age including neonates and infants.

The disease is mild in most people; in some it progresses to pneumonia with hypoxemia. In a smaller subset, it leads to acute respiratory distress syndrome with multi organ dysfunction. Severe disease is seen more commonly in the elderly and those with comorbidities. The clinical features are best described in a series of 1099 patients from China⁽¹⁸⁾. The median incubation period was 4 days (interquartile range, 2 to 7). The median age of the patients was 47 years (interquartile range, 35 to 58); 1% were less than 15 years. A total of 42% were female. Fever was present in 44% of the patients on admission but developed in 89% during hospitalization. Cough was seen in 68%, fatigue/malaise in 38%, sputum production in 33%, shortness of breath in 18% sore throat/ headache/ myalgia/ chills in around 15% each. Nasal congestion (5%), nausea or vomiting (5%), diarrhea (4%), conjunctivitis (0.8%) and hemoptysis (0.8%) were uncommon. Among the overall population, 24% had at least one coexisting illness (e.g., hypertension and chronic obstructive pulmonary disease). Disease was severe in 15% and non severe in 85%. Admission to intensive care unit was

needed in 5% of the patients. Complications included ARDS (3.4%), Septic shock (1%), acute kidney injury (0.5%) and disseminated intravascular coagulation in 0.1%. The median duration of hospitalization was 12 days and mortality at time of publishing the paper was 1.4%. Five percent patients were discharged and 93.6% were still admitted.

Disease in children and neonates is usually mild with many being asymptomatic. In a series of 31 children, all were asymptomatic or had mild disease⁽¹⁹⁾.

In the largest data set from the Centers Disease Control China, of 72314 cases as of 11/2/2020 44,672 were confirmed by a positive nucleic acid test⁽²⁰⁾. The age distribution was as follows: Less than 10 years 1%, 10-19 years 1%, 20-29 years 8%, 30-79 years 87% and >80 years 3% (18). Eighty one percent had mild disease while 14% had severe disease (ie, dyspnea, blood oxygen saturation \leq 93%, partial pressure of arterial oxygen to fraction of inspired oxygen ratio <300, and/ or lung infiltrates >50% within 24 to 48 hours), and 5% were critical (ie, respiratory failure, septic shock, and/ or multiple organ dysfunction or failure). The overall case-fatality rate (CFR) was 2.3%. No deaths occurred in the group aged 9 years and younger, but cases in those aged 70 to 79 years had an 8.0% CFR and cases in those aged 80 years and older had a 14.8% CFR. No deaths were reported among mild and severe cases. The CFR was 49.0% among critical cases. CFR was elevated among those with preexisting comorbid conditions—10.5% for cardiovascular disease, 7.3% for diabetes, 6.3% for chronic respiratory disease, 6.0% for hypertension, and 5.6% for cancer.

Diagnosis^(1,21)

At this time, suspect cases in India are defined as patients with acute respiratory symptoms (fever, cough, sore throat, shortness of breath) with history of international travel to places with ongoing local transmission or those with history of close contact with patients with laboratory proven/ suspect COVID-19 infection.

Definitive diagnosis is by demonstration of COVID-19 RNA by specific molecular tests (RT-PCR) in respiratory samples (nasal swab, throat swab, sputum, endotracheal aspirates or bronchoalveolar lavage). Sometimes patients can be negative on repeated testing. Viral loads are similar between symptomatic and asymptomatic people. Virus can also be detected in blood and stool. In large case series from China, co infections with other viruses has not been described. Hence if other viruses are detected on molecular tests,

testing for COVID-19 may not be required if testing resources are scarce. At this time, testing in India is limited to 52 government centers. Testing in private labs and hospitals may soon become available.

The other laboratory investigations are non-specific, mimicking other viral infections⁽¹⁸⁾. The complete blood count shows normal or reduced white cell count with lymphopenia. The platelet count is normal or mildly low. The CRP and ESR are high but the procalcitonin values are generally normal. The ALT and AST are usually normal or mildly elevated. There is also elevation of the LDH, CPK, prothrombin time and D-dimer values. Highly sensitive troponin I was elevated in some patients indicative of acute cardiac injury. High white cell counts, high neutrophil counts, absolute lymphocyte counts < 1000, marked elevation of liver enzymes, LDH, CPK, D dimer levels and prothrombin time, elevated procalcitonin and marked elevation of inflammatory cytokines including IL2, IL7, IL10, GCSF, IP10, MCP1, MIP1A, and TNF α are associated with severe disease⁽²²⁾.

The CT is more sensitive than CXR in picking up pneumonia and can be abnormal even in asymptomatic people/ those with mild disease. In the series of 1099 patients from China, while CXR were positive in 60% of patients, the CT was abnormal in 86% (84% in mild disease and 95% in severe disease)⁽¹⁸⁾. CT usually shows bilateral multiple ground glass opacities (GGO) and consolidation soft in the subpleural position and sometimes interstitial abnormalities. In patients with respiratory symptoms and strong epidemiologic risk factors for COVID-19 and initial negative molecular tests, positive CT findings helped in making a diagnosis. These patients then were positive on subsequent testing for COVID-1⁽²³⁾. Hence, CT may help in diagnosis and prognostication of COVID-19.

The illness should be differentiated from other causes of pneumonia such as influenza, RSV, adenovirus, parainfluenza virus, pneumonia due to atypical organisms (mycoplasma, Chlamydia and legionella) and bacterial pneumonia⁽²¹⁾.

Treatment⁽²¹⁾

Treatment is essentially supportive. Patients who are not sick should be instructed to stay at home. Patients with severe disease or lower respiratory tract infections need hospitalization. The first aim is to prevent transmission of the infection to other patients and the health care workers as discussed later.

Supportive therapy entails administration of fluids, oxygen, non invasive ventilation and sometimes

mechanical ventilation. Few patients have been treated with extra corporeal membrane oxygenation (ECMO) too. Antibiotics do not prevent bacterial superinfection, they should be given only when bacterial infection is suspected. Corticosteroids have been used in some patients especially those with severe disease; while international guidelines advocate against their use, Chinese guidelines recommend them^(24,25). The neuraminidase inhibitor oseltamivir has no activity against COVID-19.

In the case series of 1099 patients from China, 58% of patients were given antibiotics and 36% oseltamivir (in several it was empirical before diagnosis of COVID-19). Oxygen was given to 41%, mechanical ventilation to 6% (invasive in 2.1% and non invasive in 5.3%), ECMO in 0.5%, continuous renal replacement therapy in 0.8%. Eighteen percent received corticosteroids and 13% intravenous immunoglobulin⁽¹⁸⁾.

Use of antiviral drugs in the current outbreaks has been based on previous experiences during the SARS and MERS outbreaks⁽²⁶⁾. In a historical control study, the combination of lopinavir and ritonavir with ribavirin among SARS-CoV patients was associated with substantial clinical benefit (fewer adverse clinical outcomes) as compared to historical controls who had been treated with ribavirin alone. Randomized controlled trials to assess the efficacy of lopinavir-ritonavir with ribavirin in COVID-19 have been initiated. Pre clinical data shows potent efficacy of remdesivir (a broad-spectrum antiviral nucleotide prodrug) to treat Ebola and coronavirus infections. A patient in California who developed severe pneumonia with COVID-19 responded favorably to remdesivir used on a compassionate trial basis⁽²⁷⁾. Other therapeutic agents that have been suggested include use of interferons, serum from patients recovered from COVID-19, chloroquine and hydroxychloroquine (for their immunomodulatory effects)⁽²⁸⁾. There are some references to use of arbidol (an antiviral used in China, Russia) and Chinese herbs in a recent advice from China⁽²¹⁾.

Prevention⁽²⁹⁾

Since at this time there are no approved treatments for this infection, prevention is crucial. Several properties of this virus make prevention difficult namely non specific features of the disease, the infectivity even before onset of symptoms in the incubation period, transmission from asymptomatic people, long incubation period, tropism for mucosal surfaces such as the conjunctiva, prolonged duration of the illness and

transmission even after clinical recovery.

The greatest risk in COVID-19 is transmission to health care workers. In the SARS outbreak of 2002, 21% of those affected were health care workers. Till date, almost 3300 health care workers in China have been infected with 22 deaths⁽³⁰⁾. The doctor who first warned about the virus has died too. It is important to protect health care workers to ensure continuity of care and to prevent transmission of infection to other patients. Patients should be placed in separate rooms or cohorted together. Negative pressure rooms are not needed. The rooms and surfaces and equipment should undergo regular decontamination preferably with sodium hypochlorite. Health care workers should be provided with fit tested N95 respirators and protective suits and goggles. Airborne transmission precautions should be taken during aerosol generating procedures such as intubation, suction and tracheostomies. It is currently recommended that patients be discharged or deisolated when they are fever free for 3 days and negative for the virus on throat swab testing on two separate occasions 24 hours apart⁽²¹⁾. As the epidemic progresses and numbers increase, it may not be possible to test patients before de isolating them. There should be restriction of visitors.

Following measures are recommended by WHO to be followed in the community. Using hand hygiene every 15-20 minutes helps not only in protection against coronavirus but also other pathogens. People with respiratory symptoms should follow cough etiquette covering their nose or mouth with sleeve/ tissue and not hands while coughing or sneezing. Surgical masks are recommended to be worn by people with respiratory symptoms to prevent transmission of infection to others rather than by the non ill. Avoiding crowded places, contact with live/ dead animals and postponing non essential travel are other recommendations.

On a still larger level, even more measures are being adopted to curb the spread of the disease. This includes lock down of provinces (Italy), curbing of air travel, cancelling of visas (India has cancelled visas for Japan, South Korea, Italy and Iran), compulsory quarantine of all international visitors (Israel), cancelling of gatherings, meetings, sporting events and conferences, promoting working from home, school closures (Italy) are some of them. Whether all these interventions will slow/ curb the spread of the virus is still unknown. A candidate vaccine is under development.

Practice points for Indian Practitioners

- Health care workers should take history of interna-

tional travel of all patients with respiratory symptoms specifically as well as contact with sick people who may have travelled to these areas.

- They should set up a system of triage of patients with respiratory illness to separate rooms in the outpatient department and give them a simple surgical mask to wear. They should use surgical masks themselves while examining such patients and practice hand hygiene frequently.
- Suspected cases should be referred to government designated centres for isolation and testing (in Mumbai at this time it is Kasturba hospital).
- Patients admitted with severe pneumonia and acute respiratory distress syndrome should be evaluated for travel history and placed under contact and droplet isolation. Regular decontamination of surfaces should be done. They should be tested for etiology using multiplex PCR panels (eg Biofire pneumonia panel) if logistics permit and in case no pathogen is identified be considered for testing for COVID-19.
- All clinicians should keep themselves updated about recent developments including global spread of disease
- Non essential international travel should be avoided.
- People should stop spreading myths and false information about the disease and try to allay panic and anxiety of the public

Conclusions

It seems like the COVID-19 is here to stay for some time. It is going to challenge the health care resources and public health infrastructure of many countries. The World Health Organization should take a lead in the fight against this virus and set up policies that will prevent such future epidemics. Countries should also look at trying to curtail zoonotic infections in humans by bringing about change in how animals are traded, killed and eaten.

References

1. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. *Lancet*. 2020;S0140-6736(20)30185-9.
2. Ayittey FK, Ayittey MK, Chiwero NB, Kamasah JS, Dzuovor C. Economic Impacts of Wuhan 2019-nCoV on China and the World. *J Med Virol*. 2020;10.1002/jmv.25706. Coronavirus Outbreak. Available at <https://www.worldometers.info/coronavirus/>. Accessed on February 16,2020.
3. Coronavirus Outbreak. Available at [The Indian Practitioner □ Vol.73 No.3. March 2020](https://www.worldom-

</div>
<div data-bbox=)

- eters.info/coronavirus/. Accessed on March 10,2020.
4. World Health Organization. Novel Coronavirus (2019-nCoV) Situation Report-22. Available at https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200211-sitrep-22-ncov.pdf?sfvrsn=fb6d49b1_2. Accessed on February 16, 2020.
 5. Coronaviridae Study Group of the International Committee on Taxonomy of Viruses. The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nat Microbiol.* 2020;10.1038/s41564-020-0695-z.
 6. Chan-Yeung M, Xu RH. SARS: epidemiology. *Respirology.* 2003;8 Suppl:S9-S14.
 7. Middle East Respiratory Syndrome Coronavirus. Available at <https://www.who.int/emergencies/mers-cov/en/>. Accessed on February 16, 2020.
 8. Li Q, Guan X, Wu P, *et al.* Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. *N Engl J Med.* 2020;10.1056/NEJMoa2001316.
 9. World Health Organization. Situation reports. Available at <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/>. Accessed on February 16, 2020.
 10. An update on the epidemiologic characteristics of novel coronavirus pneumonia (COVID-19). Special Expert Group for Control of the Epidemic of Novel Coronavirus Pneumonia of the Chinese Preventive Medicine Association. *Zhonghua Liu Xing Bing Xue Za Zhi.* 2020;41(2):139-144.
 11. Li Q, Guan X, Wu P, *et al.* Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. *N Engl J Med.* 2020;10.1056/NEJMoa2001316.
 12. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and its inactivation with biocidal agents. *J Hosp Infect.* 2020;S0195-6701(20)30046-3. doi:10.1016/j.jhin.2020.01.022
 13. Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patient. *Can J Anaesth.* 2020;10.1007/s12630-020-01591-x.
 14. Rothe C, Schunk M, Sothmann P, *et al.* Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany. *N Engl J Med.* 2020;10.1056/NEJMc2001468.
 15. H Chen, J Guo, C Wang, *et al.* Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *Lancet (2020)*. doi.org/10.1016/S0140-6736(20)30360-3.
 16. Zhang, C Wang, CC Gao. Neonatal coronavirus expert confirmed at 30 hours of birth: vertical transmission from mother to infant. Available at: http://www.cnr.cn/hubei/yuanchuang/20200205/t20200205_524961963.shtml (Feb 5, 2020), Accessed 10th Feb 2020
 17. Lauer SA, Grantz KH, Bi Q, *et al.* The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. *Ann Intern Med.* 2020;10.7326/M20-0504.
 18. Guan WJ, Ni ZY, Hu Y, *et al.* Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med.* 2020;10.1056/NEJMoa2002032.
 19. Wang D, Ju XL, Xie F, *et al.* Clinical Analysis of 31 Cases of 2019 Novel Coronavirus Infection in Children From Six Provinces (Autonomous Region) of Northern China. *Zhonghua ErKe Za Zhi.* 2020;58(4):E011.
 20. Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention *JAMA.* 2020;10.1001/jama.2020.2648.
 21. Jin YH, Cai L, Cheng ZS, *et al.* A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version). *Mil Med Res.* 2020;7(1):4.
 22. Lippi G, Plebani M. Laboratory abnormalities in patients with COVID-2019 infection. *Clin Chem Lab Med.* 2020;j/cclm.ahead-of-print/cclm-2020-0198/cclm-2020-0198.xml.
 23. Huang P, Liu T, Huang L, *et al.* Use of Chest CT in Combination with Negative RT-PCR Assay for the 2019 Novel Coronavirus but High Clinical Suspicion. *Radiology.* 2020;200330.
 24. Russell CD, Millar JE, Baillie JK. Clinical evidence does not support corticosteroid treatment for 2019-nCoV lung injury. *Lancet.* 2020;395[10223]:473-475.
 25. Zhao JP, Hu Y, Du RH, *et al.* Expert Consensus on the Use of Corticosteroid in Patients With 2019-nCoV Pneumonia. *Zhonghua Jie He He Hu Xi Za Zhi.* 2020;43[0]:E007.
 26. Chen N, Zhou M, Dong X, *et al.* Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet.* 2020;395(10223):507-513.
 27. Holshue ML, DeBolt C, Lindquist S, *et al.* First Case of 2019 Novel Coronavirus in the United States. *N Engl J Med.* 2020;10.1056/NEJMoa2001191.
 28. Zhang L, Liu Y. Potential Interventions for Novel Coronavirus in China: A Systemic Review. *J Med Virol.* 2020;10.1002/jmv.25707.
 29. World Health Organization. Coronavirus disease (COVID-19) technical guidance: Infection prevention and control. Available at <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/infection-prevention-and-control>. Accessed on Feb 20,2020.
 30. Wang J, Zhou M, Liu F. Exploring the reasons for health-care workers infected with novel coronavirus disease 2019 (COVID-19) in China. *J Hosp Infect.* 2020;S0195-6701(20)30101-8.

