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COVID- 19: What we know so far and what are the implications for India?

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Abstract:
Background: The world is currently facing very difficult times, with the novel Corona virus infection becoming a global pandemic of such enormous proportions. The causative agent has been found to be a strain of corona virus now named as 2019 novel corona virus (SARS CoV-2) and the disease caused is called as corona virus disease (COVID-19). As the medical community is struggling to provide care to the infected, the administration of the affected countries is trying its best to prevent the spread of the infection. The researchers on their part are working at a feverish pace to gather as much information about the new virus as possible which will help humanity overcome this pandemic. COVID-19 is turning out to be a rapidly evolving situation and it is extremely important that all of us remain aware and updated and this review article is therefore of great importance both to the scientific community as well as the citizens of the country.
Methods: A comprehensive search for review articles, meta-analysis, original research and clinical trials related to the novel corona virus and COVID-19 was made to collect information on all the recent developments in this area. Data sources primarily included PubMed with MeSH terms and free text, Cochrane library and Google Scholar.
Results: There is a lot of published data available in the public domain, but new evidence is coming up every day. We can say that there is still a lot more that we need to know about the virus to tackle the challenges posed by the COVID-19 infection.
Conclusion: As the number of positive cases keeps increasing in India and there is a growing fear of community transmission, everyone needs to remain updated with the ever growing knowledge about this deadly disease. This review aims to help the public and scientific community by providing the current status of the disease.
Key words*: novel corona virus, COVID-19, SARS CoV-2, pandemic*

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I. Introduction

The world is currently facing very difficult times, with the novel Corona virus infection becoming a global pandemic of such enormous proportions which hardly anyone would have thought of as possible by any stretch of imagination till a couple of months back, except perhaps in a science-fiction movie. In a meeting on January 30, 2020, as per the International Health Regulations, the outbreak was declared by the WHO as a Public Health Emergency of International Concern (PHEIC) as it had spread to 18 countries with four countries reporting human-to-human transmission. The causative agent has been found to be a strain of corona virus which was initially named as 2019 novel corona virus (2019-nCoV) later named SARS CoV-2 by the experts of the International committee on Taxonomy of Viruses. The disease caused was named as corona virus disease (COVID-19) by WHO on 11 Feb 2020 by which time the number of cases in China, where it all started, had already surpassed 42,000 with more than a 1000 people succumbing to the disease. [1] By 11 Mar 2020, the number of cases outside China had increased 13- fold as the disease spread rapidly in many countries across the world. The official number of cases was more than 118,000 cases in 114 countries with more than 4,000 people dead and thousands more fighting for their lives forcing the WHO to declare COVID -19 a pandemic. [2]At that time, the pandemic was just beginning to rear its head in India with 60 confirmed cases and a single death reported. [3] The corona virus pandemic is a crisis unlike anything that we have witnessed in the modern times. The UN Secretary-General António Guterres asked world leaders to come together and offer an urgent and coordinated global response. On 16 Mar 2020, WHO issued an advisory to all countries to test every suspected case of COVID-19 and to isolate not just the patient but also all those that they have been in close contact with up to 2 days before they developed symptoms. Testing, isolation and care were the three measures emphasized by the organization. [4] This new virus seems to be very contagious and has spread very quickly paralyzing both the lives of people and economies of the countries across the globe. As the number of positive cases keeps

increasing in India and there is a growing fear of community transmission, everyone needs to remain updated with the ever growing knowledge about this deadly disease.

II. Material And Methods

A comprehensive search for review articles, meta-analysis, original research and clinical trials related to the novel corona virus and COVID-19 was made to collect information on all the recent developments in this area. Data sources primarily included PubMed with MeSH terms and free text, Cochrane library and Google Scholar.

III. Discussion

History:

The history of human coronaviruses began in 1965 when Tyrrell and Bynoe found a virus named B814 obtained from the respiratory tract of an adult with common cold and was responsible for the majority of the upper respiratory tract infections in children. Since 2003, at least 5 new human coronaviruses have been identified, including the Severe Acute Respiratory Syndrome (SARS) coronavirus and the Middle East Respiratory Syndrome (MERS), which caused significant morbidity and mortality. After the SARS epidemic, the animal coronaviruses came in the spotlight and Coronavirology garnered a lot of interest and importance among the scientific community. [5]

Background:

COVID-19 is caused by a coronavirus which belongs to a large family of viruses that are common in people and also in many different species of animals, including camels, cattle, cats, and bats. The SARS-CoV-2 virus, like MERS-CoV and SARS-CoV, has its origins in bats and can infect humans and then spread between people. [6] SARS-CoV-2 is a betacoronavirus with a single-stranded, enveloped RNA, belonging to the sarbecovirus subgenus of the Coronaviridae family. It was discovered through the use of unbiased sequencing in samples from human airway epithelial cells in patients with pneumonia. This new virus is the seventh member of the family of coronaviruses that infect humans. [7]Within a time of less than a month since infections surfaced, the novel coronavirus was identified, isolated and viral genome (29,903 nucleotides) was sequenced by three groups of Chinese scientists. The genetic sequence analysis revealed that the 2019-nCoV shares a 79.0% nucleotide identity to SARS-CoV and 51.8% identity to MERS-CoV. Phylogenetic analysis revealed that the virus was most closely related (89.1% nucleotide similarity) to a group of SARS-like coronaviruses that had previously been found in bats in China and geneticists estimate a recent single spill-over event into humans could have happened in November 2019. Bats were already hibernating at the time of onset of this epidemic and no bats were sold at the Huanan food market in Wuhan, which suggests the role of an intermediate animal host where adaptation to human transmission might have occurred. It has been claimed, but not yet substantiated that snakes or pangolins were the intermediate hosts for creating the coronavirus by recombination events. [8, 9, 10] It is estimated that 2% of the population are healthy carriers of a CoV , which have a crown-like appearance under the electron microscope and are responsible for about 5% to 10% of acute respiratory infections and may also cause enteric, hepatic and neurological diseases. [11]

Genetic Structure of virus*:*

SARS-CoV-2 is an enveloped positive single-stranded RNA (ssRNA) coronavirus, two-thirds of which encodes 16 non-structure proteins (NSPs). The rest part of the virus genome encodes four essential structural proteins, including spike (S) glycoprotein, small envelope (E) protein, matrix (M) protein, and nucleocapsid (N) protein, and also several accessory proteins. S glycoprotein binds to host cell receptors, angiotensin-converting enzyme 2 (ACE2), which is a critical step for virus entry. [12]

***Origin of the infection*:**

The pandemic originated in the wet markets of China's Wuhan city and a 57-year-old female shrimp seller, Wei Guixian, has been identified as one of the first victims or 'patient zero' of coronavirus. [13]

Transmission:

Direct contact with intermediate host animals or consumption of wild animals was suspected to be the main route of SARS-CoV-2 transmission. Later it was found that individuals with no record of visiting the seafood market contracted the infection indicating a human to the human spreading capability of this virus. Current evidence indicates that transmission of the virus can occur when a healthy person is within 1 m of someone who has respiratory symptoms (e.g., coughing or sneezing) and is therefore at risk of having his/her mucosae (mouth and nose) or conjunctiva (eyes) exposed to potentially infective aerosols or respiratory droplets. Respiratory droplets are >5-10 μm in diameter and when they are <5μm in diameter, they are called droplet nuclei. Transmission of the COVID-19 virus can also occur by indirect contact with surfaces in the immediate environment or with objects used on the infected person (e.g., utensils, clothes, surfaces, door knobs, stethoscope, thermometer, etc). Airborne transmission was not reported in an analysis of 75,465 COVID-19 cases in China, however this may be possible in specific circumstances and settings in which procedures or

support treatments that generate aerosols are performed; i.e., endotracheal intubation, bronchoscopy, open suctioning, administration of nebulized treatment, manual ventilation before intubation, turning the patient to the prone position, disconnecting the patient from the ventilator, non-invasive positive-pressure ventilation, tracheostomy, and cardiopulmonary resuscitation. [14, 15] Inhalation of aerosols and air-borne particles during dental procedures also increase the risk of transfer of the infection from a carrier to a dental practitioner. A study by Jasper Fuk-Woo Chan, et al showed that person-to-person transmission may occur within family homes or hospital settings and intercity spread of this virus are possible, and therefore in the early stages of the epidemic, vigilant control measures are warranted and everyone needs to behave in a responsible way. They say that game meat trades should be regulated to terminate this portal of transmission. They however did not find any evidence of viral shedding in urine and feces of patients. [16] A study by Zhang W, et al however showed the presence of 2019-nCoV in anal swabs and blood as well, and found that there were more anal swab positives than oral swab positives in the later stage of infection, suggesting shedding and transmission through oral-fecal route. They caution that a patient cannot be discharged purely based on oral swabs negative, as he/ she may be viremic and shed the virus by oral–fecal route. [17]

Case Definition and Diagnosis:

A confirmed case of COVID-19 is defined as a case with respiratory specimens (nasopharangeal/ oropharangeal /nasal mid-turbinate swab or lower respiratory tract aspirate or bronchoalveolar lavage) that tested positive for the 2019-nCoV by at least one of the following three methods: isolation of 2019-nCoV or at least two positive results by real-time reverse-transcription–polymerase-chain-reaction (RT-PCR) assay for 2019-nCoV or a genetic sequence that matches 2019-nCoV. [18] The mean incubation time of the 2019-nCoV is estimated to be 6.4 days (95% CI, 5.6-7.7 days) but all subjects suspected to have been exposed are required to be isolated for 14 days to avoid risk of virus spread, which is the longest predicted incubation time. Xuan Jiang, et al found no observable difference between the incubation time for SARS-CoV, MERS-CoV and SARS-CoV-2. [19]

Symptoms and clinical characteristics:

Symptoms of COVID-19 are non-specific and the disease presentation can range from mild symptoms or asymptomatic to moderate cases to severe pneumonia and death. As of 20 February 2020 and based on 55,924 laboratory confirmed cases, WHO says that the signs and symptoms may include: fever (87.9%), dry cough (67.7%), fatigue (38.1%), sputum production (33.4%), shortness of breath (18.6%), sore throat (13.9%), headache (13.6%), myalgia or arthralgia (14.8%), chills (11.4%), nausea or vomiting (5.0%), nasal congestion (4.8%), diarrhea (3.7%), and hemoptysis (0.9%), and conjunctival congestion (0.8%). [20] Long-quan Li, et al also reported similar findings with varying percentages. Their studies indicate that lymphocytopenia (64.5%), leukocytopenia (29.4%), as also increased levels of C-reactive protein (CRP) (44.3%) and lactate dehydrogenase (LDH) (28.3%) were more common findings in clinical examination. They suggest that lymphocytopenia could be used as a reference index in the diagnosis of new coronavirus infections in the clinic. Men accounted for 60% (95% CI [0.54, 0.65]) of COVID-19 patients. They say that the reduced susceptibility of females to viral infections may be attributed to the protection from X chromosome and sex hormones, which play an essential role in innate and adaptive immunity. More data would be needed to substantiate these claims. In patients with severe infection, the neutrophil count, D-dimer, blood urea, and creatinine levels were found to be significantly higher while the lymphocyte counts were low. In addition, there is an increase in inflammatory factors (interleukin (IL)-6, IL-10 and tumor necrosis factor-α (TNF-α). Huang C, et al say that data of ICU patients showed higher plasma levels of IL-2, IL-7, IL-10, granulocyte colony-stimulating factor (GCSF), 10 kD interferon-gamma-induced protein (IP-10), monocyte chemoattractant protein-1 (MCP-1), macrophage inflammatory protein 1-α (MIP-1α), and TNF-α. The levels of inflammatory cytokines may be an indicator of the severity of the disease. [21, 22] Acute myocardial inflammation has also been found as a complication of SARS-CoV-2 infection and hence strict monitoring of the infected patients needs to be done. [23]

Clinical and epidemiological data from the Chinese CDC regarding 72,314 case records (confirmed, suspected, diagnosed, and asymptomatic cases) shows that there were 62% confirmed cases, 1% of which were asymptomatic, but were laboratory-positive (viral nucleic acid test). The overall case-fatality rate (on confirmed cases) was 2.3%. People of all ages can be infected but the fatal cases were primarily elderly patients, particularly, those aged over 80 years (about 15%), and 70- 79 years (8.0%). About 49% critical patients who died had preexisting comorbidities like cardiovascular disease, diabetes, chronic respiratory disease, and cancer. Only 1% of patients were less than nine years of age and no fatal cases occurred in this group. [11] Other articles report a case fatality rate of approximately 2% and a mortality of 1.4% of COVID-19 which is lesser as compared to SARS or MERS, which have had case fatality rates of 9 to 10% and 36%, respectively. Studies indicate that COVID-19 has an estimated basic reproduction number (R_0) of 2.2, which means that, on an average, each infected person spreads the infection to an additional two persons. [24] A report by WHO says that mortality seems to increases with age, with the highest mortality among people over 80 years of age (CFR 21.9%). The CFR is higher among males compared to females (4.7% vs. 2.8%) while the patients who reported

being retirees had the highest CFR at 8.9%. Patients with no comorbid conditions had a CFR of 1.4% while those with comorbid conditions had much higher rates: 13.2% for those with cardiovascular disease, 9.2% for diabetes, 8.4% for hypertension, 8.0% for chronic respiratory disease, and 7.6% for cancer. [20]

***Mother-child Transmission and Pediatric infections*:**

S H Chen, et al found that there was no intrauterine transmission of infection to fetus occurring as a result of COVID-19 infection during a late stage of pregnancy. Their study could have been limited by the small number of patients. The clinical characteristics of COVID-19 pneumonia in pregnant women were similar to those of non-pregnant adult patients with COVID-19 pneumonia. Contrary to this Lan Dong, et al found neonate born to a mother, who was diagnosed with COVID-19 23 days prior to delivery, had elevated IgM antibody levels and abnormal cytokine test results 2 hours after birth indicating that the neonate was infected in utero, as IgM are not transferred to the fetus via the placenta. Hui Zeng, et al did not detect any SARS-CoV-19 infection in the serum or throat swabs of newborns of mothers with confirmed diagnosis of COVID-19 but found virus-specific antibodies in their sera. 5 of the 6 infants had elevated IgG while IgM was detected in 2 of the infants. They say that either the placentas of the women could have been abnormal or IgM could have been produced by the infant if the virus crossed the placenta. [25, 26, 27] In another study children aged less than 15 years too were found to be infected with COVID-19 and the authors say that the small number of cases in children may be due to a lower risk of exposure or incomplete identification rather than resistance to infection. Seven of the nine infants were female countering previous studies that found more infection in men than women. [28] Pneumonia, acute liver injury and cardiac damage were observed in a 55-day old COVID-19 positive baby whose mother was infected with the virus. SARS-CoV-2 RNAs were detected in the stool specimens or anal swabs of both the baby and her mother. Surprisingly, 3 consecutive tests of SARS-CoV-2 RNA in the breast milk of the infant's mother tested negative. More data is needed to say whether the virus could not enter the milk due to some barrier and whether a confirmed case could continue to breastfeed the baby. [29] A study by Haiyan Qiu, et al found that pediatric patients in their study were asymptomatic or having mild /moderate type of COVID-19. They emphasize the importance of carefully monitoring such cases as they may play a major part in community-acquired infections. [30]

***Radiology and Histopathology*:**

Pan F et al report that in patients recovering from COVID-19 pneumonia (without severe respiratory distress during the infection), CT scans of chest indicated maximum severity about 10 days after initial onset of symptoms. [31] A case report of 2 patients of lung cancer diagnosed with COVID-19 found the lungs of both patients exhibiting edema, proteinaceous exudate, focal reactive hyperplasia of pneumocytes with patchy inflammatory cellular infiltration and multinucleated giant cells while hyaline membranes were not prominent. As both patients did not exhibit symptoms of pneumonia at the time of operation, these changes are most likely to represent an early phase of the lung pathology of COVID-19 pneumonia as they did not have symptoms of pneumonia at the time of surgery. [32]Histopathological examination of the lung sample of a patient dying of COVID-19 has shown desquamation of pneumocytes, pulmonary edema and hyaline membrane formation, indicating acute respiratory distress syndrome (ARDS). [33]

Recovery:

Discontinuation of quarantine or discharge from hospital is given after absence of clinical symptoms and radiological abnormalities and 2 negative RT-PCR test results. Lan Lan, et al found that four patients had positive RT-PCR test results 5 to 13 days later suggesting that at least a proportion of the recovered patients may still be virus carriers. So it is advisable that patients who come home after recovery from COVID-19 must avoid contact for another 15 days. [34]

Treatment:

After the outbreak, many clinical trials have been registered in China to test different compounds or combinations of compounds against the nCoV infection. The drugs being tested range from antiviral nucleotide analogs (Remdesivir), anti-viral medication Lopinavir–Ritonavir, interferon-1β, traditional Chinese herbal medicine (e.g. *Forsythia* derivative Lian qiao), etc. Nucleotide analog Remdesivir and the anti-malaria compound Chloroquine have shown promising results, being able to inhibit the novel coronavirus in the low micromolar concentration range. Chloroquine needs to be used at the beginning of the infection while Remdesivir acts on viral RNA transcription at the post-viral entry level. [8, 24] The results of a non- randomized clinical trial showed that hydroxychloroquine treatment is significantly associated with viral load reduction/disappearance in COVID-19 patients and its effect is reinforced by addition of azithromycin to the treatment. [35] A number of clinical drugs with anti-viral, anti-bacterial and anti-inflammatory effects are being tested for their potential use for treating SARS-CoV-2. Herbal medicines containing flavanoids (Hesperidin, neohesperidin, rutin, etc) and Xanthones as major components may also play meaningful role in combating the SARS-CoV-2 infections. [36]

Vaccine: Clinical and observational studies published over several decades by Danish researchers Peter Aaby and Christine Stabell Benn suggest that the tuberculosis vaccine, BCG, may increase the ability of the

immune system to fight off pathogens other than the TB bacterium. Though there are groups that don't believe this is possible, several others have started investigating how BCG may generally boost the immune system. The vaccine probably may not be able to eliminate infections with the new coronavirus completely, but it may be able to reduce the impact of the infection on individuals- says Eleanor Fish, an immunologist at the University of Toronto. [37] Live -attenuated vaccines like the BCG and measles vaccine may stimulate the immune system and protect against a wide range of other diseases. [38] Another article suggests that other childhood vaccines such as the vaccine against poliomyelitis, may offer protection against the COVID-19. It goes on to suggest that with the current lack of vaccination against COVID-19, perhaps people aged over 20 years should be vaccinated with the hepatitis B vaccine. [39] An article by Aaron Miller, Mac, et al says that the impact of COVID-19 has been different in different countries which may be attributed to many factors like the differences in cultural norms, mitigation efforts, the population, adherence to policy, availability of health infrastructure and surprisingly different national policies with respect to the BCG childhood vaccination. They found that countries without universal policies of BCG vaccination like Italy, Netherland, USA, etc have been more severely affected compared to countries which have long-standing BCG policies. They suggest that the BCG vaccination could have reduced the number of reported COVID-19 cases in a country making this vaccine a potential new tool in the fight against COVID-19. [40] Further studies and more data will be needed to prove if this is indeed true or just incidental data. And if this indeed is true, it is a ray of hope for India. Meanwhile researchers at the Murdoch Children's Research Institute in Australia have planned a randomized, multi-centre clinical trial to test the use of BCG vaccine against Covid-19 that is intended for healthcare workers. [41] A new era in vaccine development is supported by progress in areas such as genomics and structural biology. The Coalition for Epidemic Preparedness Innovation (CEPI) supports development of platform technologies to prepare for an unknown "Disease X" — like this newly emerging pandemic COVID-19. In spite of availability of novel technology to support the development of a vaccine from viral sequencing to clinical trials in less than 16 weeks, the SARS-CoV-2 vaccine development poses challenges. [42] Immune targeting of SARS-CoV-derived B cell and T cell epitopes may potentially offer protection against this novel virus. [43] Johnson & Johnson has announced that it has made progress on a vaccine to prevent COVID-19 and that it could be ready in early 2021. [44] About 35 other companies and academic institutions are in the race to develop a vaccine against the novel corona virus using both tried-and- tested approaches as well as newer technology. Prominent among these are biotech firms and pharma giants like Moderna, Novavax, CureVac and many more. [45] WHO has said that a vaccine to take on the virus would be available in 12-18 months.

In the meantime many different treatment options both traditional and novel are being explored to combat the infection. In one study, 5 critically ill patients with COVID-19 and ARDS were administered convalescent plasma containing neutralizing antibody resulting in improvement in their clinical status. [46] The editorial in the same journal says that though the treatment is compelling and not new for treatment of viral infections, it has its limitations and needs to be evaluated in a randomized control trial. [47] A study reports that among 2,173 patients with COVID-19 confirmed by SARS-CoV-2 results, blood group A seems to be associated with a higher risk for acquiring COVID-19 compared with non-A blood groups, whereas blood group O was associated with a lower risk for the infection compared with non-O blood groups. [48] An article by Mao Wang, et al speculates that lower temperatures might contribute to the transmission of the nCoV-2. [49] It has to be seen if higher temperatures will acutally reduce the transmission of the virus.

Today, most countries across the world are investing all their resources to meet the COVID-19 challenge. The response strategies of almost all countries include contact tracing and self-isolation or quarantine, promoting public health measures like encouraging frequent hand-washing, practicing respiratory etiquette, and maintaining social distancing. Health facilities have been strengthened to manage the surge of patients and measures are being taken to prevent and control infections as well as handle and care the infected. [50] Directives have been issued to postpone or cancel large-scale public gatherings, lockdowns have been implemented, borders of countries have been sealed, public transport and flights stand cancelled, educational institutes are closed, more people are working from home, jobs are being lost, industries have been crippled and for many life has come to a standstill and the future doesn't look very bright at the moment.

IV. Conclusion

In a time-line starting from January and reaching the present day, there are 4714 active cases of COVID-19 in India with 410 cured or discharged and 149 deaths reported as on 08 April 2020. [51] The government of India has declared a lockdown of 21 days from 25th Mar 2020. Ben Cowling, an epidemiologist at the University of Hong Kong says that when it is time to relax the lockdown, everyone needs to be alert to a second wave of infection. [52] But another study is very reassuring when it says that the probability of COVID-19 resurgence when work resumes in China is very limited or even negligible. [53] Life in Wuhan is gradually getting back to normal and, if fresh cases are not reported, it bodes well for the world. Two Indian-origin researchers from the University of Cambridge in the UK feel that a three-week lockdown in India is insufficient to prevent a

resurgence of the pandemic and have come up with a new mathematical model that predicts a flat 49-day nationwide lockdown—or sustained lockdown with periodic relaxation extending over two months. [54] While some countries used draconian measures to gain control over the pandemic, other countries where measures were not so stringent have suffered brutally. In India, we don't know the trajectory of the pandemic, our resources are limited, our population is large, complex and diverse and, our health system is weak. The challenges before India are incredible but our health workers, administrators, the police, the engineers, the scientific community and the public are rising up to the challenge very well. What worked to our advantage was that when cases began rising in India, there was a lot of information about the virus in the public domain and we weren't fighting a totally unknown enemy. The government and a vigilant administration is following the 3 Ts of Tracing, Testing and Treatment in their efforts to flatten the curve of new infections and not overwhelm the health system. In this effort the public has to play a big role by maintaining social distancing, washing hands regularly and using masks. They also need to come forward to report travel history and any development of symptoms. Many hotspots of infection have emerged in different parts of India which can spread locally and cause a surge in cases unless aggressive control measures are implemented. Our behavior will determine the direction of this pandemic. Information about the virus is growing every day and the infodemic seems to be more dangerous than the pandemic. So it the responsibility of every citizen to keep himself/ herself updated with information from reliable sources. The Indian government has made a comprehensive assessment of the situation in India for the availability of medicines for all possible contingencies and has lifted restrictions to enable it to allow sending shipments of hydroxychloroquine(HCQ) and other drugs to nations badly affected by the pandemic. ICMR has issued an advisory for rapid antibody-based blood tests for COVID-19 especially in areas reporting a cluster of cases, in camps for migrant workers and centers to house evacuees. A lot of 'Make in India' initiatives like multi-use ventilators, Personal Protection Equipment (PPE), surveillance systems, testing facilities, detection kits, vaccine development, etc are some of the important positive developments that have happened in a short span of time. The government is undecided on whether to extend the lockdown or do it in phases. Saving lives of people affected by COVID-19 is important but equally important is to save the lives of people who lives are getting badly affected due to the economic lockdown and the administration is trying its best to do a balancing act. Humanity has realized that we are powerless against a tiny-speck of nature and that we have limited options for treating life-threatening zoonotic coronavirus infections. But hope dominates all other human emotions and we strongly hope that very soon mankind is able to bring this pandemic under control.

Acknowledgment

The author acknowledges the selflessness, dedication, resilience and hard work of the doctors, nurses, health care workers, scientists, engineers, police, the administration and all others who are working towards keeping us safe in these turbulent times and dedicates this article to their tireless efforts.

Note: At the time of this article going to print, the Government of India has extended the lockdown till 3rd May 2020 and the number of active cases in India stand at 11,906 with 1991 cured/ discharged and 480 deaths as on 18 April 2020 at 11.50 am.[51]

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