A Review on Pandemic Situation of Corona Virus (Covid-19)

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Abstract:
Coronaviruses (CoV) are large family of viruses that cause illness ranging from the common cold to more severe Acute Respiratory Syndrome (SARS-CoV). A novel Coronavirus -19 (nCoV) is a new strain that has not been previously identified in humans. Coronaviruses are zoonotic, meaning they are transmitted between animals and humans. Detailed investigations funs that in the past, SARS-CoV was transmitted from Civet cats to humans and MERS-CoV (Middle East Respiratory Syndrome Virus) from dromedary Camels to humans. Several known Coronavirus are circulating in animals that have not yet infected humans. The virus that causes nCOVID-19 infects people and spreads easily from person to person. COVID-19 pandemic has left world aghast over the large number of incidences within a short span. This Research Paper deals with Introduction, Outbreak, Spread, Response, Management and Treatment. Efficacious transmittal of COVID-19 has compelled numerous countries worldwide to embrace temporary yet dramatic measures such as locking down entire cities, restricting all forms of transportation, imposing lockdowns, maintaining social distancing etc. As a result of COVID-19 global spread, most of the world has come to a standstill, with precautionary pandemic related several phases of lockdowns. COVID-19 related lockdowns have drastic effects on social and economic fronts. The Lockdowns have witnessed that the economy came crashing down in addition to significant economic outflow for COVID-19 related fight. Post COVID-19 lockdown, the country has to concentrate its actions for not only reviving the economy, but also sustaining the health of its populace & environment. On the other hand, the air pollution levels have plummeted, water bodies have cleared up, and skies in some of the most polluted cities have turned blue. Worldwide, there have been positive changes in the environment, some of which were witnessed after decades. India, being a densely populated country, imposed a strict nationwide lockdown mandate since the last week of March 2020. Government of India is taking all necessary steps to ensure fight against the pandemic of COVID-19. The most important factor in preventing the spread of the virus locally is to empower the citizens with the right information and taking precautions as per the advisories being issued by Government from time to time. This paper discusses the effects of COVID-19 restrictions on several aspects of environment broadly in Indian scenario.

*Note : These are the views of authors not organization

I. INTRODUCTION

The current outbreak of novel coronavirus disease was first reported in Wuhan, China, on 31 December 2019. On March 11, 2020 the nCOVID-19 outbreak was characterized as a pandemic by the World Health Organization (WHO). Coronaviruses (CoV) are large family of viruses that cause illness ranging from the common cold to more severe Acute Respiratory Syndrome (SARS-CoV). A novel Coronavirus -19 (nCoV) is a new strain that has not been previously identified in humans. [1] Coronaviruses are zoonotic, meaning they are transmitted between animals and people.

Detailed investigations funs that in the past, SARS-CoV (Severe Acute Respiratory Syndrome-Corona Virus) was transmitted from Civet cats to humans and MERS-CoV (Middle East Respiratory Syndrome Corona Virus) from dromedary Camels to humans. Several known Coronavirus are circulating in animals that have not yet infected humans. [2] The Virus that Causes nCOVID-19 infects people and spreads easily from person to person. Coronaviruses are a group of enveloped viruses with nonegmented, single-stranded, and positive-sense RNA genomes. Apart from infecting a variety of economically important vertebrates (such as pigs and chickens), six coronaviruses have been known to infect human hosts and cause respiratory diseases. [3] Among them, severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) are zoonotic and highly pathogenic coronaviruses that have resulted in regional and global outbreaks.

Coronaviruses possess a distinctive morphology, the name being derived from the outer fringe, or —coron of embedded envelope protein. Members of the family Coronaviridae cause a broad spectrum of animal and human diseases. Uniquely, replication of the RNA genome proceeds through the generation of a nested set of viral mRNA molecules. Human coronavirus (HCoV) infection causes respiratory diseases with mild to severe outcomes.

In the last 15 years, we have witnessed the emergence of two zoonotic, highly pathogenic HCoVs:

Severe Acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV), [4] Replication of HCoV is regulated by a diversity of host factors and induces drastic alterations in cellular structure and physiology.
Studies on the genome organization of SARS-CoV-2 have shown that it has four structural proteins, S (spike), E (envelope), M (membrane) and N (nucleocapsid) proteins (Figure 1). The SARS-CoV-2 virion has a genome size of 29.9 kb. It possesses a nucleocapsid composed of genomic RNA and phosphorylated nucleocapsid (N) protein. SARS-CoV-2 has surface viral proteins, namely, spike proteins.
II. TYPES OF CORONAVIRUSES

Coronaviruses belong to the subfamily Coronavirinae in the family Coronaviridae. Different types of human coronaviruses vary in how severe the resulting disease becomes, and how far they can spread. Doctors currently recognize seven types of coronavirus that can infect humans. Common types are listed below:

1. 229E (alpha coronavirus)
2. NL63 (alpha coronavirus)
3. OC43 (beta coronavirus)
4. HKU1 (beta coronavirus)

Rarer strains that cause more severe complications include MERS-CoV, which causes Middle East respiratory syndrome (MERS), and SARS-CoV, the virus responsible for severe acute respiratory syndrome (SARS). In 2019, a dangerous new strain called SARS-CoV-2 started circulating, causing the disease COVID-19.

Outbreak

In December 2019, a novel coronavirus, new major epidemic foci of coronavirus disease 2019 (COVID-19), some without traceable origin, had been identified and started expanding rapidly in Europe, North America, Asia, and the Middle East, with the first confirmed cases being identified in African and Latin American countries. Over a period of 30 days, the spread reached from its initial spreading stage to a global outbreak, hence, affecting nations worldwide lethally. Lockdowns in several countries were announced in surge to prevent as much spread as possible.

By March 16, 2020, the number of cases of COVID-19 outside China had increased drastically and the number of affected countries, states, or territories reporting infections to WHO was 143. Two days later, WHO launched the Solidarity Trial, known to be an international clinical trial which aimed to generate data from all over the world in order to obtain the most effective and possible treatments for COVID-19. Studies are being carried out to develop an effective vaccine against the spread. The lockdowns have been lifted carefully in many countries with frequent short term curfews. Although, an awareness among people has been spread to maintain social distancing and personal hygiene, the spread has somewhat been out of the human control.

Epidemiology of NCOVID 19

In December 2019, many pneumonia cases that were clustered in Wuhan city were reported and searches for the source have shown Huanan Seafood Market as the origin.[6] The first case of the COVID-19 epidemic was discovered with unexplained pneumonia on December 12, 2019, and 27 viral pneumonia cases with seven being severe, were officially announced on December 31, 2019. Etiologic investigations have been performed in patients who applied to the hospital due to similar viral histories of these patients had strengthened the likelihood of an infection transmitted from animals to humans. On January 22, 2020, novel CoV had been declared to be originated from wild bats and belonged to Group 2 of beta-coronavirus that contains Severe Acute Respiratory Syndrome Associated Coronavirus (SARS-CoV)
Signs and Symptoms of Ncovid-19
The most common symptoms of COVID-19 are fever, tiredness, and dry cough. Some patients may have aches and pains, nasal congestion, runny nose, sore throat or diarrhea. These symptoms are usually mild and begin gradually. Some people become infected but don’t develop any symptoms and don’t feel unwell. Most people (about 80%) recover from the disease without needing special treatment. Around 1 out of every 6 people who gets COVID-19 becomes seriously ill and develops difficulty breathing. Older people, and those with underlying medical problems like high blood pressure, heart problems or diabetes, are more likely to develop serious illness. People with fever, cough and difficulty breathing should seek medical attention.

Spread
On the basis of “alarming levels of spread and severity, and by the alarming levels of inaction”, on March 11 2020, the Director-General of WHO characterised the COVID-19 situation as a pandemic allied SARS-CoV-2 has resulted in the outbreak of a respiratory illness known as COVID-19. People can catch COVID-19 from others who have the virus. The disease can spread from person to person through small droplets from the nose or mouth which are spread when a person with COVID-19 coughs or exhales. These droplets land on objects and surfaces around the person. Other people then catch COVID-19 by touching these objects or surfaces, then touching their eyes, nose or mouth. People can also catch COVID-19 if they breathe in droplets from a person with COVID-19 who coughs out or exhales droplets. This is why it is important to stay more than 1 meter (3 feet) away from a person who is sick. The WHO Strategic and Technical Advisory Group for Infectious Hazards (STAG-IH) regularly reviews and updates its risk assessment of COVID-19 to make recommendations to the WHO health emergencies programme. STAG-IH’s most recent formal meeting on March 12, 2020, included an update of the global COVID-19 situation and an overview of the research priorities established by the WHO Research and Development Blueprint Scientific Advisory Group that met on March 2, 2020, in Geneva, Switzerland, to prioritise the recommendations of an earlier meeting on COVID-19 research held in early February, 2020.3 In this Comment, we outline STAG-IH’s understanding of control activities with the group’s risk. The main way the disease spreads is through respiratory droplets expelled by someone who is coughing. The risk of catching COVID-19 from someone with no symptoms is very low. Many people with COVID-19 experience only mild symptoms. This is particularly true at the early stages of the disease. It is therefore possible to catch COVID-19 from someone who has, for example, just a mild cough and does not feel ill.

Response
To respond to COVID-19, many countries are using a combination of containment and mitigation activities with the intention of delaying major surges of patients and levelling the demand for hospital beds, while protecting the most vulnerable from infection, including elderly people and those with comorbidities. Activities to accomplish these goals vary and are based on national risk assessments that many times include estimated numbers of patients requiring hospitalization and availability of hospital beds and ventilation support. Most national response strategies include varying levels of contact tracing and self-isolation or quarantine; promotion of public health measures, including hand washing, respiratory etiquette, and social distancing; preparation of health systems for a surge of Severely ill patients who require isolation, oxygen, and mechanical ventilation; strengthening health facility infection prevention and control, with special attention to nursing home facilities; and postponement or cancellation of large-scale public gatherings.[7] Some lower-income and middle-income countries require technical and financial support to successfully respond to COVID-19, and many African, Asian, and Latin American nations are rapidly developing the capacity for PCR testing for COVID-19.[2] Based on more than 500 genetic sequences submitted to GISAID (the Global Initiative on Sharing All Influenza Data), the virus has not drifted to significant strain difference and changes in sequence are minimal. There is no evidence to link sequence information with transmissibility or virulence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) the virus that causes COVID-19. SARS-CoV-2, like other emerging high-threat pathogens, has infected health-care workers in China4, 5 and several other countries. To date, however, in China, where infection prevention and control was taken seriously, nosocomial transmission has not been a major amplifier of transmission in this epidemic.[8] Epidemiological records in China suggest that up to 85% of human-to-human transmission has occurred in family clusters4 and that 2055 health-care workers have become infected, with an absence of major nosocomial outbreaks and some supporting evidence that some health-care workers acquired infection in their families.4, 5 These findings suggest that close and unprotected exposure is required for transmission by direct contact or by contact with fomites in the immediate environment of those with infection. Continuing reports from outside China suggest the same means of transmission to close contacts and persons who attended the same social events or were in circumscribed areas such as office spaces or cruise ships [3] From studies of viral shedding in patients with mild and more severe infections, shedding seems to be greatest during the early phase of disease (Myoung-don Oh and Gabriel Leung, WHO Collaborating Centre for Infectious Disease Epidemiology and Control, School of Public Health, LKS Faculty of Medicine, The University of Hong Kong, Hong Kong, Special Administrative Region, China, personal communication).[8][9] The role, if any, of asymptomatic carriers in transmitting infection is not yet completely understood.[4] Pre-symptomatic infectiousness is a concern (Myoung-don Oh and Gabriel Leung, personal communication).[8][9] and many countries are now using 1–2 days of symptom onset as the start day for contact identification.[4] A comprehensive report published by the Chinese Centre for Disease Control and Prevention on the epidemiological characteristics of 72,314 patients with COVID-19 confirmed previous understanding that most known infections cause mild disease, with a case fatality ratio that ranged from 2.9% in Hubei province to 0.4% in the other Chinese provinces.[5] This report also suggested that elderly people, particularly those older than 80 years, and people with comorbidities, such as cardiac disease, respiratory disease, and diabetes, are at greatest risk of serious disease and death. [9]The case definition used in China changed several times as COVID-19 progressed, making it difficult to completely characterise the natural history of infection, including the mortality ratio.[4] Information on mortality and contributing factors from outbreak.
sites in other countries varies greatly, and seems to be influenced by such factors as age of patients, associated comorbidities, availability of isolation facilities for acute care for patients who need respiratory support, and surge capacity of the health-care system. Individuals in care facilities for older people are at particular risk of serious disease as shown in the report of a series of deaths in an elderly care facility in the USA.[10] [5]

**Drugs Used**

Anti-tumor necrosis factor (TNF) antibodies have been identified in disease tissues of patients with COVID-19. Although there are many potential drug candidates for reducing inflammation in COVID-19, only a few drugs such as the anti-TNF antibodies are potentially effective, widely available, and have a well-established safety profile[10]. No Specific drugs has been identified yet

**Diagnosis**

Diagnosis is made based on clinical features and history of International travel or a close contact with NCOVID POSITIVELY TESTED patients. The CDC (The Centers for Disease control and Prevention) recommends collection of three specimen types lower respiratory and serum (Blood) specimens for testing. If you develop symptoms of coronavirus disease 2019 (COVID-19) and you've been exposed to the COVID-19 virus, it is advised to contact your doctor. Tell him or her if you've travelled to any areas with ongoing community spread of the COVID-19 virus according to CDC and WHO. In addition to this, let your doctor know if you've had close contact with anyone who has been diagnosed with COVID-19. Factors used to decide whether to test a person for the virus that causes COVID-19 may differ depending on where they live. Depending on the location, one may need to be screened by a nearby clinic to determine if testing is appropriate and available. In the U.S., the doctor will determine whether to conduct tests for the virus that causes COVID-19 based on the signs and symptoms, as well as whether the suspected patients have had close contact with someone diagnosed with COVID-19 or travelled to or lived in any areas with ongoing community spread of the COVID-19 virus in the past 14 days. The doctor may also consider testing if a person is at higher risk of serious illness. To test for the COVID-19 virus, a health care provider uses a long swab to take a sample from the nose or throat. The samples are then sent to a lab for testing. In case of saliva (sputum) presented in cough, that may be sent for testing as well. The U.S. Food & Drug Administration (FDA) has authorized at-home tests for the COVID-19 virus.

**Real time Reverse Transcription – Polymerase Chain Reaction (rRT-PCR)**

This is used to diagnose nCOVID-19 in respiratory samples from clinical specimens. Real-time reverse transcription-polymerase chain reaction (RT-PCR) assay was developed to rapidly detect the severe acute respiratory syndrome–associated coronavirus (SARS-CoV). The assay, based on multiple primer and probe sets located in different regions of the SARS-CoV genome, could discriminate SARS-CoV from other human and animal coronaviruses with a potential detection limit of <10 genomic copies per reaction. The real-time RT-PCR assay was more sensitive than a conventional RT-PCR assay or culture isolation and proved suitable to detect SARS-CoV in clinical specimens. Application of this assay will aid in diagnosing SARS-CoV infection. There is no specific antiviral treatment for nCOVID-19. People with nCovid-19 will get medical care to help relieve symptoms. nCOVID-19 may present with mild, moderate, or Severe illness; The Severe illness presents pneumonia, Acute Respiratory Distress Syndrome, sepsis and septic shock. Early recognition of suspected patients allows for timely initiation of infection prevention and Control[6]

**An Anti-body Test**

An Anti-body test also known as serological tests, are used to find out the presence of virus in a body. In this method of testing, blood samples are used to find anti-bodies. This process also detects the quantity of antibodies that are produced by the immune system.

It is an indirect method of testing as it cannot find the virus, but can determine if the immune system has encountered it. Anti-bodies can show up between 9-28 days after the infection has set in. By this time, an infected person can spread the disease, if not isolated.

**Treatment of NCOVID 19**

Currently, no medication is recommended to treat COVID-19, and no cure is available. Antibiotics aren’t effective against viral infections such as COVID-19. Researchers are testing a variety of possible treatments. Antibiotics do not work against viruses, they only work on bacterial infections. Antibiotics should not be used as a means of prevention or treatment of COVID-19. They should only be used as directed by a physician to treat a bacterial infection.

The FDA has granted permission for a medication approved for other diseases to be used to treat severe COVID-19 when no other options are available. An antiviral drug, Remdesivir, has been approved for this use.

In case of mild symptoms, the patient is suggested to recover at home in isolation. Special instructions to monitor the symptoms and to avoid coming in contact with others is advisable. It’s also advised to wear mask at all times, especially when an infected person is around family members or pets and to use a separate bedroom and bathroom. The doctors may recommend home isolation for a period of 14-20 days. The follow ups need to occur regularly to monitor any changes in health of the patient. Local health department is extremely helpful in guiding a patient. However, in case of extreme illness or a patient with a history of other chronic illnesses, the treatment is rather advisable to be at a hospital.

**Convalescent plasma therapy**

Convalescent plasma therapy is based on the concept of passive immunity, where antibodies of some disease developed in a person are used for treating others. Plasma in the blood contains antibodies, which helps to fight foreign pathogens. Once they have dealt with a certain kind of foreign element, some blood cells act as a memory cell and store information. When they come in contact with the same kind of pathogens again they identify and defect it quickly by producing the same antibodies.

**III. PREVENTION AND CONTROL**

There is no potential therapeutic treatment or vaccine available for COVID-19 as of now and hence the only control measure which can be undertaken is ‘prevention’. The primary mode of
entry in the human body is through respiratory tract but it also gets transmitted through fomites, conjunctiva, faecal -oral route, and body fluids. The human transmission can be prevented at the first stage if effective screening and isolation is practiced. The screening and detection of disease at the earlier stage has helped in reducing the morbidity and mortality in various countries. The PCR based testing is considered to be the gold standard for screening COVID-19 being a sensitive, specific, and rapid detection qualitative assay which can help in early detection at onset of infection. The other important ways to prevent COVID-19 is maintaining social distancing (1-3 meters) and following hygiene practices as per the WHO guidelines. As far as the treatment is concerned, the patients are given symptomatic treatment or are provided and tested for compassionate treatment. Present strategy of treatment of COVID-19 cases involves the use of broad-spectrum antiviral drugs like Favipiravir, Remdesivir, Ribavirin, Oseltamivir, Ganciclovir etc. The other existing drugs used for the treatment are DexamethasoneTocilizumab39 and Camostat mesylate. It is clear that urgent research is needed to identify new chemotherapeutic drug for the treatment, currently there are more than 80 clinical trials under process for testing the efficiency and effectivity of new drugs. Similarly, there are around 128 vaccines in preclinical evaluation phase and around 13 are under the clinical trial phase as on 18th June 2020. A most effective yet simple treatment modality is use of convalescent plasma but this has a limitation of its own in case of an outbreak situation due to limiting availability.

Protection measures for everyone:
Stay aware of the latest information on the COVID-19 outbreak, available on the national, state and local public health authority. Many countries around the world have seen cases of COVID-19 and several have seen outbreaks. Authorities in China and some other countries have succeeded in slowing or stopping their outbreaks. However, the situation is unpredictable so check regularly for the latest news.
I. You can reduce your chances of being infected or spreading COVID19 by taking some simple precautions: Regularly and thoroughly clean your hands with an alcohol based hand rub or wash them with soap and water. Washing your hands with soap and water or using alcohol-based hand rub kills viruses that may be on your hands.
II. Maintain at least 1 metre (3 feet) distance between yourself and anyone who is coughing or sneezing.
III. When someone coughs or sneezes they spray small liquid droplets from their nose or mouth which may contain virus. If you are too close, you can breathe in the droplets, including the COVID-19 virus if the person coughing has the disease.
IV. Avoid touching eyes, nose and mouth. Hands touch many surfaces and can pick up viruses. Once contaminated, hands can transfer the virus to your eyes, nose or mouth. From there, the virus can enter your body and can make you sick.
V. Make sure you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with your bent elbow or tissue when you cough or sneeze. Then dispose of the used tissue immediately. Why? Droplets spread virus. By following good respiratory hygiene you protect the people around you from viruses such as cold, flu and COVID-19.
VI. Stay home if you feel unwell. If you have a fever, cough and difficulty breathing, seek medical attention and call in advance. Follow the directions of your local health authority. Why? National and local authorities will have the most up to date information on the situation in your area. Calling in advance will allow your health care provider to quickly direct you to the right health facility. This will also protect you and help prevent spread of viruses and other infections.

- Keep up to date on the latest COVID-19 hotspots (cities or local areas where COVID-19 is spreading widely). If possible, avoid traveling to places – especially if you are an older person or have diabetes, heart or lung disease. Why? You have a higher chance of catching COVID-19 in one of these areas.
- Follow the guidance outlined above (Protection measures for everyone) o Self-isolate by staying at home if you begin to feel unwell, even with mild symptoms such as headache, low grade fever (37.3 C or above) and slight runny nose, until you recover. If it is essential for you to have someone bring you supplies or to go out, e.g. to buy food, then wear a mask to avoid infecting other people. Avoiding contact with others and visits to medical facilities will allow these facilities to operate more effectively and help protect you and others from possible COVID-19 and other viruses. If you develop fever, cough and difficulty breathing, seek medical advice promptly as this may be due to a respiratory infection or other serious condition. Call in advance and tell your provider of any recent travel or contact with travelers. Calling in advance will allow your health care provider to quickly direct you to the right health facility. This will also help to prevent possible spread of COVID-19 and other viruses.

Incubation Period of NCOVID 19
The “incubation period” means the time between catching the virus and beginning to have symptoms of the disease. Most estimates of the incubation period for COVID-19 range from 1-14 days, most commonly around five days. These estimates will be updated as more data become available.

Duration of Survival of Virus on Surface
It is not certain how long the virus that causes COVID-19 survives on surfaces, but it seems to behave like other corona viruses. Studies suggest that corona viruses (including preliminary information on the COVID-19 virus) may persist on surfaces for a few hours or up to several days. This may vary under different conditions (e.g. type of surface, temperature or humidity of the environment). If you think a surface may be infected, clean it with simple disinfectant to kill the virus and protect yourself and others. Clean your hands with an alcohol-based hand rub or wash them with soap and water. Avoid touching your eyes, mouth, or nose. The likelihood of an infected person contaminating commercial goods is low and the risk of catching the virus that causes COVID-19 from a package that has been moved, travelled, and exposed to different conditions and temperature is also low.

Susceptibility of Infection of COVID-19 from pets
While there has been one instance of a dog being infected in Hong Kong, to date, there is no evidence that a dog, cat or any pet can transmit COVID-19. COVID-19 is mainly spread through droplets produced when an infected person coughs, sneezes, or speaks. To protect yourself, clean your hands frequently and thoroughly.
Susceptibility of Infection of COVID-19 from Animal Source

Coronaviruses are a large family of viruses that are common in animals. Occasionally, people get infected with these viruses which may then spread to other people. For example, SARS-CoV was associated with civet cats and MERS-CoV is transmitted by dromedary camels. Possible animal sources of COVID-19 have not yet been confirmed. To protect yourself, such as when visiting live animal markets, avoid direct contact with animals and surfaces in contact with animals. Ensure good food safety practices at all times. Handle raw meat, milk or animal organs with care to avoid contamination of uncooked foods and avoid consuming raw or undercooked animal products.

Management

If there is only mild illness, providing care at home may be considered, with strict precautions when to seek care. But to contain the disease it is preferred to isolate the patient at the healthcare and discharge after the patient has been tested negative in two consecutive test 24 hours apart[10]. Early identification of those with severe acute respiratory infection related to nCOVID-19 should be isolated at the first of contact with health care system. Emergency treatment should be started based on disease Severity.[6]

Measures to prevent the Spread of nCOVID-19

I. Washing Hands Frequently.
II. Regularly and thoroughly cleaning hands with an alcohol-based hand rub or washing them with Soap Water.
III. Rationale: When someone coughs or sneezes they spray small liquid droplets from their nose or mouth which may contain virus. Others who are in Close contact can breathe in the droplets, including the nCOVID-19 virus if the person coughing has the disease.
IV. Avoid touching eyes, nose and mouth.
V. Practise respiratory hygiene.
VI. Isolation and Quarantine.
VII. People with Travel History[7].

Environmental sustainability and future perspectives of COVID-19

Lockdown restrictions
The current COVID-19 situation has taught us what we, as the human population, will have to do in order to manage and conserve the planet’s ecosystems from the future inevitable environmental crises.[28]

The major findings relating the sustainability of environment as a result of lockdown restrictions are listed below:
I. Owing to the course of lockdown of transportation, industrial activities amid the coronavirus outbreak, most of the pivot pollutant concentrations in the ambient air decreased significantly. On the contrary, indoor air quality adverse during lockdown period.
II. Data pertaining to river water quality before and during lockdown exhibited remarkable differences in strength (or characteristics) of flowing water. Water quality of river Yamuna at some locations even satisfied drinking water quality standards of BOD. Nevertheless, continuous release of domestic wastewater and its confluence with freshwater decreased DO level at several locations too. Overall, such improvement in river quality could reinforce attempts to be pursued by authorities to implement water quality preservation schemes in more prominent and effective manner during the post-pandemic recovery period.[29]

III. Based on the availability of limited data, it can be concluded that the generation of MSW has reduced significantly; however, a drastic increase in the generation of BMW, plastic waste is observed in the past few months. A massive reduction in the recycling of waste has been found as a major obstacle in the circular economy approach. Managing BMW during this crisis has been identified as a big challenge to the local civic authorities.[30]

IV. It can be stated that noise pollution caused due to human activities have decreased in the past couple of months. This can be considered as a good time for nature to revitalize itself. Human beings will also agree that instead of living in the constant assault of the noise generated by the modern society, these quieter times actually have a calming effect.

V. A mixed opinion about the emission of carbon dioxide is reported Many investigations/reports have suggested the emission of CO2 could fall by 5–8% during the lockdown period. However, a recent report published by UNEP indicates that the CO2 emissions are rising sharply during the lockdown period. Almost all the major countries, including India, have observed a halt in transport (ground, rail-based and aviation), construction activities and human movement, which led to a sharp decline in anthropogenic emissions and noise levels, and improvement in water and air quality. Several animals (Olive Ridley turtles were seen nesting during daytime on an Odisha beach after 7 years), fish (South Asian river dolphins returned to Kolkata ghats after 30 years) and bird species (migration of ~25–30% more flamingos compared to last year in Talawe wetland, Mumbai) were seen returning to their natural habitats (Katariya, 2020). However, the sudden activation of all the human activities in future (post-lockdown) holds the possibilities of spike in emissions and overall pollutant concentrations nationwide. Since the disease is still spreading across the globe, people are still facing lockdown restrictions, and the restricted data is not yet available, nothing can be deduced clearly at the time. But, decrease in environmental pollution as a result of coronavirus restrictions will surely compel government bodies, scientists, legislators, autonomous authorities and other regulatory agencies to use the resources sensibly

Management of COVID-19

Mild Cases
In the containment phase, patients with suspected or confirmed mild COVID-19 are being isolated to break the chain of transmission. Patients with mild disease may present to primary care/outpatient department, or detected during community outreach activities, such as home visits or by telemedicine. Mild cases can be managed at Covid Care Centre, First Referral Units (FRUs), and Community Health Centre (CHC), sub-district and district hospitals. Detailed clinical history is taken including that of co-morbidities. Patient is followed up daily for temperature, vitals and Oxygen saturation (SpO2). Patients should be monitored for signs and symptoms of complications that should prompt urgent referral. Patients with risk factors for severe illness should be monitored closely, given the possible risk of
deterioration. If they develop any worsening symptoms (such as mental confusion, difficulty breathing, persistent pain or pressure in the chest, bluish coloration of face/lips, dehydration, decreased urine output, etc.), they should be immediately admitted to a Dedicated Covid Health Centre or Dedicated Covid Hospital. Children with mild COVID-19 should be monitored for signs and symptoms of clinical deterioration requiring urgent re-evaluation. These include difficulty in breathing/fast or shallow breathing (for infants: grunting, inability to breastfeed), blue lips or face, chest pain or pressure, new confusion, inability to awaken/not interacting when awake, inability to drink or keep down any liquids.

**Moderate Cases**

Patients with suspected or confirmed moderate COVID-19 (pneumonia) is to be isolated to contain virus transmission. Patients with moderate disease may present to an emergency unit or primary care/outpatient department, or be encountered during community surveillance activities, such as active house to house search or by telemedicine. The defining clinical assessment parameters are Respiratory Rate of more than or equal to 24 per minute and oxygen saturation (SpO2) of less than 94% on room air (range 90-94%). Such patients will be isolated in Dedicated Covid Health Centre (DCHC) or District hospital or Medical College hospitals. The patient will undergo detailed clinical history including co-morbid conditions, measurement of vital signs, Oxygen saturation (SpO2) and radiological examination of Chest X-ray. Complete Blood Count and other investigations as indicated. Antibiotics should not be prescribed routinely unless there is clinical suspicion of a bacterial infection.

**Severe Cases**

I. 1 Early supportive therapy and monitoring 1. Symptomatic treatment with paracetamol and antitussives to be continued.

II. 2. Oxygenation: Give supplemental oxygen therapy immediately to patients with Severe Covid and respiratory distress, hypoxaemia, or shock: Initiate oxygen therapy at 5 L/min and titrate flow rates to reach target SpO2 ≥ 90% in non-pregnant adults and SpO2 ≥ 92- 96% in pregnant patients. Children with emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions) should receive oxygen therapy during resuscitation to target SpO2≥94%.

III. All areas where patients with Severe Covid are cared for should be equipped with pulse oximeters, functioning oxygen systems and disposable, single use, oxygen-delivering interfaces (nasal cannula, simple face mask, and mask with reservoir bag). Use contact precautions when handling contaminated oxygen interfaces of patients with COVID – 19.

IV. 3. Use conservative fluid management in patients with Severe Covid when there is no evidence of shock.

V. 4. Anticoagulation: High prophylactic dose of UFH/ LMWH (e.g. enoxaparin 40 mg BD SC) if not at high risk of bleeding. *Contraindications: End stage renal disease, active bleeding, emergency surgery.

VI. 5. Corticosteroids: IV Methylprednisolone 1-2 mg/kg or Dexamethasone one 0.2-0.4 mg/kg for 5-7 days 6. Investigational therapy: Tobilizumab (Off Label) Anti IL-6 therapy.

**Management of hypoxicem respiratory failure and ARDS**

Recognize severe hypoxic respiratory failure when a patient with respiratory distress is failing standard oxygen therapy. Patients may continue to have increased work of breathing or hypoxemia even when oxygen is delivered via a face mask with reservoir bag (flow rates of 10-15 L/min, which is typically the minimum flow required to maintain bag inflation; FiO2 0.60-0.95). Hypoxicem respiratory failure in ARDS commonly results from intrapulmonary ventilation- perfusion mismatch or shunt and usually requires mechanical ventilation. Lung protective ventilation strategy by ARDS net protocol:

- Tidal volume 6ml/kg, RR 15-35/min, PEEP 5-15cm H2O; target plateau pressure < 30cm H2O, target SpO2 88-95% and/or PaO2 55-80mmHg Prone ventilation to be considered when there is refractory hypoxemia; PaO2/FiO2 ratio 0.6 with PEEP > 5cm H2O. High – Flow Nasal Cannula oxygenation (HFNO) or non – invasive mechanical ventilation: When respiratory distress and/or hypoxemia of the patient cannot be alleviated after receiving standard oxygen therapy, high – flow nasal cannula oxygen therapy or non – invasive ventilation can be considered. Compared to standard oxygen therapy, HFNO reduces the need for intubation. Patients with hypercapnia (exacerbation of obstructive lung disease, cardiogenic pulmonary oedema), hemodynamic instability, multi-organ failure, or abnormal mental status should generally not receive HFNO, although emerging data suggest that HFNO may be safe in patients with mild- moderate and nonworsening hypercapnia. Patients receiving HFNO should be in a monitored setting and cared for by experienced personnel capable of endotracheal intubation in case the patient acutely deteriorates or does not improve after a short trial (about 1 hr).

**Management of septic shock**

- Recognize septic shock in adults when infection is suspected or confirmed AND vasopressors are needed to maintain mean arterial pressure (MAP) ≥65 mmHg AND lactate is ≥2 mmol/L, in absence of hypovolemia. Recognize septic shock in children with any hypotension (systolic blood pressure [SBP] 2 SD below normal for age) or two of the three of the following: altered mental state; tachycardia or bradycardia (HR 160 bpm in infants and HR150 bpm in children); prolonged capillary refill (>2 sec) or warm vasodilation with bounding pulses; tachypnea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia.

- In the absence of a lactate measurement, use MAP and clinical signs of perfusion to define shock. Standard care includes early recognition and the following treatments within 1 hour of recognition: antimicrobial therapy and fluid loading and vasopressors for hypotension. The use of central venous and arterial catheters should be based on resource availability and individual patient needs.

- In resuscitation from septic shock in adults, give at least 30 ml/kg of isotonic crystalloid in adults in the first 3 hours. In resuscitation from septic shock in children in well-resourced settings, give 20 ml/kg as a rapid bolus and up to 40-60 ml/kg in the first 1 hr. Do not use hypotonic crystalloids, starches, or gelatins for resuscitation.[31] Fluid resuscitation may lead to volume overload, including respiratory failure. If there is no response to fluid loading and signs of volume overload appear (for example, jugular venous distension, crackles on lung auscultation, pulmonary edema on imaging, or hepatomegaly in children), then reduce or discontinue fluid administration. This step is particularly important where mechanical ventilation is not available.
Alternate fluid regimens are suggested when caring for children in resource-limiting settings.

- Crystalloids include normal saline and Ringer’s lactate. Determine need for additional fluid boluses (250-1000 ml in adults or 10-20 ml/kg in children) based on clinical response and improvement of perfusion targets. Perfusion targets include MAP (>65 mmHg or age-appropriate targets in children), urine output (>0.5 ml/kg/hr in adults, 1 ml/kg/hr. in children), and improvement of skin mottling, capillary refill, level of consciousness, and lactate. Consider dynamic indices of volume responsiveness to guide volume administration beyond initial resuscitation based on local resources and experience. These indices include passive leg raising test, fluid challenges with serial stroke volume measurements, or variations in systolic pressure, pulse pressure, inferior vena cava size, or stroke volume in response to changes in intrathoracic pressure during mechanical ventilation.
- Administer vasopressors when shock persists during or after fluid resuscitation. The initial blood pressure target is MAP ≥ 65 mmHg in adults and age-appropriate targets in children.
- If central venous catheters are not available, vasopressors can be given through a peripheral IV, but use a large vein and closely monitor for signs of extravasation and local tissue necrosis. If extravasation occurs, stop infusion. Vasopressors can also be administered through intraosseous needles.
- If signs of poor perfusion and cardiac dysfunction persist despite achieving MAP target with fluids and vasopressors, consider an inotrope such as dobutamine.

Other therapeutic measures

For patients with progressive deterioration of oxygenation indicators, rapid worsening on imaging and excessive activation of the body’s inflammatory response, glucocorticoids can be used for a short period of time (3 to 5 days). It is recommended that dose should not exceed the equivalent of Methylprednisolone 1–2 mg/kg/day OR Dexamethasone 0.2-0.4 mg/kg/day. Note that a larger dose of glucocorticoid will delay the removal of coronavirus due to immunosuppressive effects. Prophylactic dose of UFH or LMWH (e.g., enoxaparin 40 mg per day SC) should be given for anti-coagulation. Control of co-morbid conditions should be ensured. For pregnant severe cases, consultations with obstetric, neonatal, and intensive care specialists (depending on the condition of the mother) are essential. Patients often suffer Page 18 from anxiety and fear and they should be supported by psychological counseling[31]

Investigational Therapies

At present, use of these therapies is based on a limited available evidence. As the situation evolves, and when more data become available, the evidence will be accordingly incorporated, and recommendation upgraded. Further, use of these drugs is subjected to limited availability in the country as of now. Currently, these drugs should only be used in a defined subgroup of patients: i. Remdesivir (under Emergency Use Authorization) may be considered in patients with moderate disease (those on oxygen) with none of the following contraindications:

- AST/ALT > 5 times Upper limit of normal (ULN)
- Severe renal impairment (i.e., eGFR < 30 ml/min/m2 or need for hemodialysis)
- Pregnancy or lactating females
- Children (< 12 years of age) Dose: 200 mg IV on day 1 followed by 100 mg IV daily for 4 days (total 5 days) ii. Convalescent plasma (Off Label) may be considered in patients with moderate disease who are not improving (oxygen requirement is progressively increasing) despite use of steroids. Special prerequisites while considering convalescent plasma include:
  - ABO compatibility and cross matching of the donor plasma
  - Neutralizing titer of donor plasma should be above the specific threshold (if the latter is not available, plasma IgG titer (against S-protein RBD) above 1:640 should be used)
  - Recipient should be closely monitored for several hours post transfusion for any transfusion related adverse events
  - Use should be avoided in patients with IgA deficiency or immunoglobulin allergy Dose: Dose is variable ranging from 4 to 13 ml/kg (usually 200 ml single dose given slowly over not less than 2 hours[31]

Measures to Use and Dispose Masks

Only wear a mask if you are ill with COVID-19 symptoms (especially coughing) or looking after someone who may have COVID-19. Disposable face mask can only be used once. If you are not ill or looking after someone who is ill then you are wasting a mask. There is a worldwide shortage of masks, so we urge people to use masks wisely. We advise rational use of medical masks to avoid unnecessary wastage of precious resources and mis-use of masks. The most effective ways to protect yourself and others against COVID-19 are to frequently clean your hands, cover your cough with the bend of elbow or tissue and maintain a distance of at least 1 meter (3 feet) from people who are coughing or sneezing. Some measures to be carried out are:

I. Remember, a mask should only be used by health workers, caregivers, and individuals with respiratory symptoms, such as fever and cough.
II. Before touching the mask, clean hands with an alcohol-based hand rub or soap and water.
III. Take the mask and inspect it for tears or holes.
IV. Orient which side is the top side (where the metal strip is).
V. Ensure the proper side of the mask faces outwards (the coloured side).
VI. Place the mask to your face. Pinch the metal strip or stiff edge of the mask so it moulds to the shape of your nose.
VII. Pull down the mask’s bottom so it covers your mouth and your chin.
VIII. After use, take off the mask; remove the elastic loops from behind the ears while keeping the mask away from your face and clothes, to avoid touching potentially contaminated surfaces of the mask.
IX. Discard the mask in a closed bin immediately after use.
X. Perform hand hygiene after touching or discarding the mask – Use alcohol-based hand rub or, if visibly soiled, wash your hands with soap and water.

AAROGYA SETU IVRS 1921: For including the citizens with features phones and landlines under the protection of AAROGYA SETU, the Aarogya Setu IVRS service has been implemented. This service is available Pan-India. This is a toll-free service.
- Citizens need to give a missed call to the number 1921. Call will get disconnected and citizens will receive a call back requesting for inputs regarding their health.
• The questions asked are aligned to the Aarogya Setu App. Based on the responses given, citizens will get a SMS indicating the health status. Citizens will continue to get alerts for their health moving forward also.
• For an effective citizen inclusion, the service needs to be popularized extensively.
• The service is implemented in 11 regional languages same as the app and SMS is sent to the citizen in the same language in which, he has shared his information.
• The input is made part of the Aarogya Setu database and information is processed to send alerts to the citizen on the action to be taken to ensure their safety.

States/UTs are requested to
1. To inform the public in their States/UTs about this 1921 service with a request to inform the media in their states also
2. To inform the people about the official nature of this exercise and they should be aware of any other calls by pranksters or phishing/fishing attempts from any other number.
3. To host the information about this service in your State Health Department’s home page and other departments’ homepage.

IV. CONCLUSIONS

NCOVID – 19 (Novel Corona Virus Disease – 19 ) is an infectious disease causes by a newly discovered Corona Virus. The best way to prevent and slow down n COVID-19 transmission is by being well informed about the NCOVID-19 virus, the disease it causes and how it spreads [10] Take care of your health and Protect others by following the measures and guidelines shared in this course which are sourced from WHO, CDC and Ministry of Health and Family Welfare.[19] Over the past 50 years the emergence of many different coronavirus uses that cause a wide variety of human and veterinary diseases has occurred,[11] It is likely that these viruses may continue to emerge and to evolve and cause both human and veterinary outbreaks owing to their ability to recombine, mutate, and infect multiple species and cell types. Future research on coronaviruses will continue to investigate many aspects of viral replication and pathogenesis. First, understanding the propensity of these viruses to jump between species, to establish infection in a new host, and to identify significant reservoirs of coronaviruses will dramatically aid in our ability to predict when and where potential epidemics may occur.[12] As bats seem to be a significant reservoir for these viruses, it will be interesting to determine how they seem to avoid clinically evident disease and become persistently infected. Second, many of the non-structural and accessory proteins encoded by these viruses remain uncharacterized with no known function, it will be important to identify mechanisms of action for these proteins as well as defining their role in viral replication and pathogenesis. [13] These studies should lead to a large increase in the number of suitable therapeutic targets to combat infections. Furthermore, many of the unique enzymes encoded by coronaviruses, such as ADP-ribose-11-phosphatase, are also present in higher eukaryotes, making their study relevant to understanding general aspects of molecular biology and biochemistry. [13] Third, gaining a complete picture of the intricacies of the RTC will provide a framework for understanding the unique RNA replication process used by these viruses. Finally, defining the mechanism of how coronaviruses cause disease and understanding the host immune pathological response will significantly improve our ability to design vaccines and reduce disease burden.[14] The outbreak of COVID-19 swept across China rapidly and has spread to more than 85 countries/territories/areas outside of China as of 5 March 2020 [2]. Scientists have made progress in the characterization of the novel coronavirus and are working extensively on the therapies and vaccines against the virus.[18] We have summarized the current knowledge of SARS-CoV-2 as follows: Firstly, the emerging pneumonia, COVID-19, caused by SARS-CoV-2, exhibits strong infectivity but less virulence, compared to SARS and MERS, in terms of morbidity and mortality.[21] Certainly, COVID-19 has become a huge threat for whole World including INDIA, however, due to Government insights, it will get ended soon. Government of India is taking all necessary steps to ensure fight against the pandemic of COVID-19 the Corona Virus. The most important factor in preventing the spread of the Virus locally is to empower the citizens with the right information and taking precautions as per the advisories being issued by Government from time to time. This paper discusses the effects of COVID-19 restrictions on several aspects of environment broadly in Indian scenario. The various strategies adopted by Republic of India helped the Country to combat the pandemic situation of COVID-19.

V. REFERENCES


Ministry of Health and Family Welfare [31].


[31]. Ministry of Health and Family Welfare