# An Overview of Medical and Epidemiological Aspects of COVID-19

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**Abstract:**

*A novel strain of Coronavirus first reported on 31st December, 2019 in Wuhan, China has sequentially spread to affect societies and overwhelmed medical systems around the world. World Health Organization (WHO) declared Coronavirus disease (COVID-19) to be a pandemic on March 11, 2020. Inhalation of infected droplets has been implicated as the main route of acquiring the infection. Fever, tiredness and dry cough are the most common symptoms. However, patients may remain asymptomatic or may need hospitalization with severe symptoms. There are no approved therapies directed at treating the disease. Treatment is supportive and vaccine trials are currently underway. WHO has tried to dispel many rumors regarding the disease including the unwarranted use of Hydroxy-chloroquine drug. Regular hand-washing and maintaining social distancing have been the major tools in fighting COVID-19. Declining number of cases have been seen in countries that adhered to health guidelines and despite the uncertainty surrounding the evolution of the disease, encouraging reports herald a hopeful future regarding the disease.*

***Key words:*** *Coronavirus, COVID-19, World Health Organization, Hand washing, Social distancing*

## 1. INTRODUCTION:

On 31 December 2019, a cluster of cases of respiratory infections with unknown etiology was reported to the World Health Organization (WHO) China Country Office from the city of Wuhan in China (Novel Coronavirus – China- 2020). A novel strain of Coronavirus was implicated as the causative agent of this infection on 7th January 2020.

It is worth noting that while Coronaviruses have been known and studied for quite some time now [e.g.- another strain of Coronavirus was responsible for Severe Acute Respiratory Syndrome (SARS) epidemic of 2002], the current strain was novel. Little was known about the clinical and epidemiological aspects of the disease at that time. The International Committee on Taxonomy of Viruses (ICTV) announced "severe acute respiratory syndrome Coronavirus-2 (SARS-CoV-2)" as the name of the new virus on 11 February 2020 (Naming the Coronavirus disease, 2020).

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This novel disease later renamed as Coronavirus Disease (COVID-19), sequentially spread around the world to affect populations in all six continents. WHO declared COVID-19 to be a pandemic on March 11, 2020 [Coronavirus Disease (COVID-19) - events as they happen, 2020]. A 'pandemic' is defined as *"an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people"* (Kelly, 2011). At the time of writing this article, COVID-19 has affected 213 countries and territories around the world and 2 international conveyances (Worldometer, 2020a).

WHO and Centers for Disease Control and Prevention (CDC) have issued standard guidelines for dealing with the Coronavirus pandemic. The guidelines have been revised regularly with the evolution of the disease.

## 2. OBJECTIVES:

i. To explore the latest updates on clinical and epidemiological aspects of Coronavirus disease (COVID-19)

ii. To highlight important awareness and preventive measures against COVID-19

## 3. DISCUSSION:

### 3.1 Transmission:

The primary route of transmission of COVID-19 is via respiratory droplets. Droplets generated by infected individuals while speaking, sneezing, or coughing can travel to a distance of around 6 feet. Inhalation of infected droplets has been implicated as the main route of acquiring the infection. (CDC). There is no evidence of spread via houseflies or mosquitoes.

**Figure 1: Number of confirmed COVID-19 cases reported in the last seven days by country, territory or area, 19 June to 25 June**

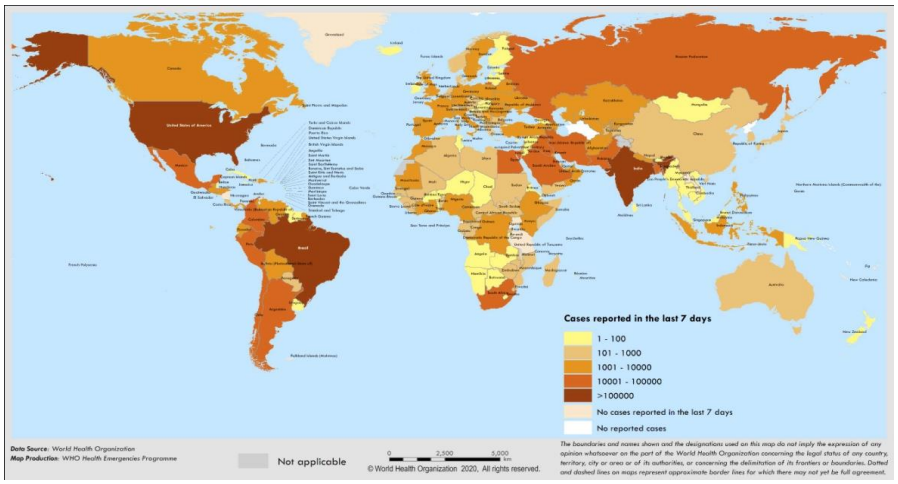
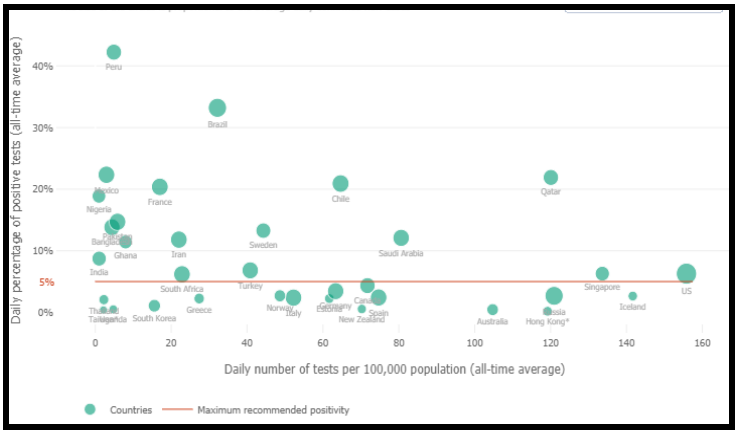



*Figure Source: WHO*

A total of 1,20,92,503 samples have been tested in India as of July 13, 2020 [SARS-CoV-2 (COVID-19) Testing Status, 2020]. Testing for COVID-19 involves taking samples in the form of swabs from the nasopharynx (back of the nose) and oropharynx (back of the mouth) and testing for the presence of the virus using molecular methods (Real Time Reverse Transcriptase PCR). Antibody tests are also being employed to look for presence of antibodies that are generated by our body against the virus. However, antibody levels remain elevated despite clearing of the infection and provide future immunity against it. Positive antibody test does not mean the person is currently infected. Hence, results must be translated with caution in such patients. These methods of testing are universal and are being routinely implemented in India and everywhere else around the world.

**Figure 2: Daily number of tests per 100,000 population**




*Source: Business Standard*

As of 14th July2020, India has the third-highest number of coronavirus cases in the world. However, as seen in Figure 2, testing rates in Indiaremain low. India's testing for cases per million people is 8,760. This is much lower than in other countries like USA and Russia who respectively have 132,289 and 160,999 tests per 1 million population. (Worldometer,2020b)

Measures at the level of government and government agencies have varied widely among countries. Some countries have imposed strict lockdown measures while others have enforced milder guidelines. Rapid success has been achieved in certain countries like New Zealand where prompt closing of borders and self-isolation on arrival to the country were enforcedearly. (Jones,2020).Other countries like USA where government measures have been milder, cases continue to rise. Community transmission of SARS-CoV-2 occurs when individuals are exposed to the virus through contact with someone in their local community, rather than through travel to an affected location. (Interim Guidance on Management of Coronavirus Disease 2019 (COVID-19) in Correctional and Detention Facilities, 2020). The presence of community

transmission heralds a local rise of cases and may merit urgent additional precautionary measures by local health authorities.

### 3.2 Symptoms:

People with COVID-19 may have a wide range of symptoms – ranging from mild symptoms that resolve without hospitalization to life-threatening illnesses. It may take up to 14 days for symptoms to develop and some patients may remain asymptomatic even after getting the infection (CDC: Symptoms of Coronavirus, 2020).
People suffering from COVID-19 may present in one or more of the following ways-

i) **Asymptomatic:** It is important to know that a majority of those who get the disease may be asymptomatic or manifest symptoms not serious enough to seek medical attention.
ii) **Common symptoms:** Fever, tiredness, dry cough.
iii) **Less common symptoms:** Body aches, sore throat, runny nose, nausea, vomiting, and diarrhea, loss of sensation of taste or smell.
iv) **Serious symptoms:** Difficulty breathing or shortness of breath, chest pain, or sensation of pressure on the chest, loss of movement or speech. (CDC: Symptoms of Coronavirus, 2020). Patients with Serious Symptoms need immediate medical attention.

### 3.3 Precautions:

Since there are no approved therapies directed at treating the disease, there has been a wide consensus among health agencies around the world that adoption of these standard precautions has to be the mainstay in the fight against COVID-19. Some of these precautions have been listed below (adapted from the sources of WHO, CDC, and ICMR).

(i) Regular and thorough handwashing with soap and water for at least 20 seconds with soap and water after having been in a public place, or after blowing one's nose, sneezing, or coughing. Alcohol-based hand sanitizers (with at least 60% alcohol content) can also be used.
(ii) Maintaining a physical distancing of 2 meters from other people in public spaces. People without any symptoms can spread the disease and the strategy of 'social distancing' is paramount in combating COVID-19.
(iii) Covering of mouth while coughing or sneezing with a tissue. The tissue should be carefully discarded in a dustbin after use. If a tissue is unavailable at the moment, one should cough or sneeze into one's bent elbow (and not one's hands).
(iv) Avoiding crowded places as social distancing is difficult to maintain in such places.
(v) Staying at home and self-isolating if one has symptoms of cough, headache, body aches, mild fever.

(vi) Calling in advance before visiting medical facilities and adhering to local and national guidelines

The CDC recommends wearing cloth face masks for people older than 2 years of age in public settings (e.g. grocery stores, petrol pumps) where other social distancing measures are difficult to maintain. Cloth masks can be readily prepared at homes and they help by slowing down the spread of the virus from individuals who have the virus but have not shown symptoms (Centers for Disease Control and Prevention [CDC]: About Cloth Face Coverings, 2020).While it may be uncomfortable to wear face masks especially in the warm summer days, when properly worn they do not cause oxygen deficiency or Carbon dioxide intoxication. [Coronavirus disease (COVID-19) advice for the public: Mythbusters, 2020].

### 3.4 Vaccines and Drugs for COVID-19:

Presently there are no vaccines approved for COVID-19. However, several candidate vaccine trials were rapidly undertaken from the beginning of the outbreak and the race to market the first vaccine for COVID-19 is on. Vaccine development is a time-investing process and it takes several years for a vaccine to be approved for human use. The process involves several steps at pre-clinical and clinical levels. A vaccine goes through six major stages before reaching the public (Vaccine Testing and the Approval Process,2014)

(i) Exploratory stage
(ii) Pre-clinical stage
(iii) Clinical development
    a. Phase I: Tested on a small number of human volunteers
    b. Phase II Expanded Trials: Vaccine tested on hundreds of people
    c. Phase III: Given to thousands of people to test safety and efficacy
    d. Phase IV: After approval for use
(iv) Regulatory review and approval
(v) Manufacturing
(vi) Quality control

As of 14$^{th}$ July 2020, more than 155 candidate vaccine trials are underway of which four are in Phase III trial and a single vaccine in Russia has completed clinical trial phases (Tirumalaraju, 2020). It is too early to predict the efficacy and impact of this particular vaccine just yet but more vaccines are expected to complete trials soon.

Since the disease is caused by a virus, antibiotic medications are ineffective against it. Antibiotics act against bacteria. Drugs used for influenza are also ineffective since the virus is of a different class.

The U.S. Food and Drug Administration (FDA) has cautioned against use of the drugs Chloroquine and Hydroxychloroquine outside of hospital settings and clinical trials to potential heart rhythm problems(Center for Drug Evaluation and Research,2020). Currently, no drug products have been approved by the FDA for the treatment of COVID-19 (COVID-19 Frequently Asked Questions, 2020).

The WHO has tried to dispel many rumors and myths that have developed over the past several months regarding COVID-19. A few such examples worth noting are-Drinking alcohol and adding pepper to soups and meals do not prevent or cure the infection of COVID-19. Spraying and introduction of bleach or other disinfectants into one's body do not provide protection against COVID-19 and can be dangerous. Hot baths, ultraviolet light, eating garlic or other home available herbs have not shown to be effective in preventing or curing the disease (Coronavirus disease [COVID-19] advice for the public:Mythbusters, 2020).

**CONCLUSIONS:**

Health agencies have continuously highlighted the need for people to remain connected despite maintaining physical distancing. The pandemic has posed several unique challenges to healthcare systems, economic and social institutions.

(i) As evidenced by the examples of countries like New Zealand and South Korea, countries that adhered to the social distancing norms strictly have been able to thwart losses and a declining trend has now been noted in countries like Spain and Italy where the healthcare systems were hit hard the most in the initial stages of the outbreak.

(ii) Some experts believe the virus is unlikely to go away at all and may become a common infection in the future.Data from around the world shows the mortality rate for the infection is <2% (Mallapaty,2020).It is important to remind us that most people who get the disease recover fully and do not have long term disabilities due to it.

It is uncertain if the worst is behind us at this point.But the resurgent appreciation of public health and encouraging reports of the progress of the vaccine trials there is much to be hopeful for in the coming months.

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