

COVID-19 Infection and Prevention of the Third Wave in India

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The SARS-CoV-2 virus is a predictably unpredictable virus. It was a wildlife bat virus which originated from Wuhan district of China, and from there, it has spread across all geographies of planet Earth.

THE FIRST WAVE

The first wave was noticed in India in the year 2020. The first wave was probably due to the original Wuhan strain. The strain was spreading with an R-naught 5 of 3.5, for example; if 10 people in a family were exposed then maybe 3 or 3.5 are getting infected. The first wave reached its peak in September, by Christmas, it almost disappeared. Every mathematical model which was involved in the COVID-19 disease was incorrect. The models only predicated correctly that there would be a wave every 2–4 weeks. Genome surveillance was also ongoing in the United Kingdom and scientists were studying 5% of COVID-19-infected patients by genomics.

The COVID virus is like a football with spikes on it. The spike proteins can get an antigenic shift or antigenic drift with the amino acid sequence with spike proteins which are called mutations. The spike protein mutations were started much earlier but discovered by Public Health England in December 2020. The United Kingdom imposed complete lockdown and this was the major reason for almost complete success with COVID-19 in the United Kingdom earlier.

Suddenly from the County of Kent, a new strain appeared which is now called the UK strain. The UK strain is also called the alpha strain which also emerged in India. The genomic surveillance data from South Africa found out that there was probably a new South African strain which is called as Beta strain.

In India, at the end of the year 2020, a new Delta strain had emerged. In February 2021, an outbreak in the districts of Amravati, Akola, and Yavatmal of Maharashtra was noticed including a mini outbreak in Kerala. The Delta strain has double mutations and

probably in hindsight we know that this was the Delta strain or the Indian strain, which is B.1. 617.2^[1]

THE SECOND WAVE

The Alpha variant had landed in the North of India, because of mobility, migration, and cross-migration between Punjab, Haryana, Delhi, and the United Kingdom. The Delta variant, probably homegrown from Vidarbha and Marathwada, is the cause for the second wave. The second wave started insidiously. The Amravati district in Maharashtra reported a high test positive rate of 53, which means out of 100 people, 53 people were positive. This was the cause of concern and alert. The B J Medical College from Pune had picked up the strain and identified it.

This Delta virus strain was spreading rapidly, if a family of 10 was exposed, then all of them were getting infected. The Delta strain is a rapidly transmitting, rapidly spreading, and fast recovering but probably with a low fatality rate. It spreads like a wildfire, across India from April to May 2021. The strain is still there in June 2021. The R naught raised from 3.5 to 7, more people got infected and strained our health-care infrastructure. The Indian government imposed a semi-lockdown. Even in June 2021, approximately 40 thousand cases are reported per day in India, almost 1200–4000 people/day are dying. The second wave due to Delta strain created havoc in April 2021 and May 2021.^[2]

The second wave was very ferocious with a high fatality rate because probably, there was an admixture of Alpha and Delta strains. The Delta strain spreads fast and has more affinity to the angiotensin-converting enzyme (ACE) receptors in the lungs. The COVID-19 disease has nose, throat, and lung symptoms. When nose and throat are involved in COVID-19 diseases, 80% of patients are asymptomatic and remaining symptomatic patients recover. If the patient loses taste and smell, then the patient will recover and do very well. If the virus goes into the lungs, then it causes desaturation, the treatment with steroids, immune modulators, prone position, and oxygen supply is required.

THE DELTA PLUS STRAIN

As the second wave has been receding, a new Delta plus strain has emerged. The Alpha came from the UK, rapidly transmissible,

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probably less virulent, Beta variant is from South Africa. The Gamma variant is from Brazil and the fourth strain Delta is from India. The Delta strain is predominantly restricted to India and the Delta plus strain is AY1 or AY2 reported in the UK, Nepal, and now also in India. The Council of Scientific and Industrial Research, the Indian Council of Medical Research, and the genomic consortium mapping the genes of the virus, looking at prevalent strains in India.

As the COVID-19 cases are decreasing in India, the lockdown-related restrictions are lenient. If “lockdown” has to go away, then the test positivity rate has to be below 5% for 2 weeks. In Maharashtra, there are seven districts from the Konkan region that are of concern because of high positivity rate above 5% may be due to Delta plus strain.

It was thought that maybe the migratory workers who came from Nepal brought the Delta plus variant in Maharashtra but fortunately, the genomic testing of the Nepal strain by the Institute of Integrated Genomics and Integrative Biology, New Delhi, proved that the Nepal strain and strain found in Konkan are different.

The first wave was due to the original Wuhan strain, replaced by the Delta strain in India and now we have Delta plus or AY 1 strain. It is not yet known whether it will be more dangerous or more transmissible.

The Solutions

The people in India need to follow COVID-19 appropriate behavior, COVID appropriate protocols, and vaccinations. The COVID appropriate behavior: Use double masks because the virus is airborne. If you unmask and drink a cup of tea, you are likely to get a virus and even casual contact can spread the Delta or Delta plus strains. The transmission can occur within minutes without masks and the viral load can be very high. The second answer is to continue sanitization and the third is social distancing.

It should be a multilayer approach such as avoiding crowds, congregations, and all gatherings including social, religious, and political because the Delta plus is a super spreader, imposing

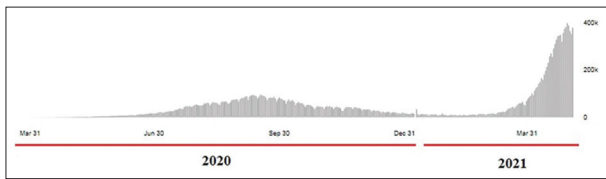


Figure 1: Rise of COVID-19 cases in India in 2020 and 2021. (Source: WHO report on COVID-19 in India)

lockdowns, large-scale testing, use of ventilated rooms, use simple exhaust fans or a HIPA filter, and mass vaccination.

Vaccination

At least 60–70% of our population needs to be vaccinated to achieve the herd immunity threshold. The test positivity rate has to be <5% for 2 weeks. Any vaccine is appropriate to achieve herd immunity. The vaccination does not prevent infection even after 2 doses but the data have clearly shown, a breakthrough infection that occurs after vaccination will be mild, very rarely cause severe disease or death. The Delta plus strain will have an immune escape, it may not respond to the antibodies, and it may have the affinity to the ACE receptors.

The health care workers also may need a booster, but may not be with the same vaccine but maybe with another and it requires evidence-based data. The health care workers need to continue double masking, being in fewer crowds, and use better ventilated environments. Even after two doses of vaccines, masks are mandatory. Try to live in bubbles, only do an essential activity.

If COVID-19 appropriate behavior, COVID appropriate protocols, and vaccinations are followed, then the third wave will be delayed. Most models predicted the third wave between September 2021 and November 2021 as shown in Figure 1. People are on the roads, not using masks, not following protocols, so the second wave will get another leap in the country which is worrisome particularly in Mumbai, particularly with Delta plus variants, because it may escape vaccines. It may be more lethal to the lungs and maybe fast transmitting too. It is a cause of concern. There is no need of measuring/testing the classical spike protein antibody IgG, it gives a false sense of security. The high IgG antibody count does not guarantee protection. The tests to measure neutralizing antibodies are available with vaccine manufacturers and few laboratories in India. At present, the dominant strain in India is Delta plus strain or AY1, detected through genomic studies. The new variants may bypass vaccines so use double masking, COVID appropriate behaviors, and protocols. In Peru, a Lambda variant is identified so new variants will keep on coming. The COVID-19 is here to stay. The WHO Report of current COVID-19 infections in India is shown in Figure 2.

At present, vaccination is controlled by the central government in India. Unfortunately, vaccines are not available in free supply and the strategy is very much dependent on the supply chain of the vaccines. Targeted vaccination of people is the correct strategy as to shrink the number of susceptible people by vaccinating, and



Figure 2: The WHO Report of current COVID-19 infections in India. (Source: WHO report on COVID-19 in India)^[3]

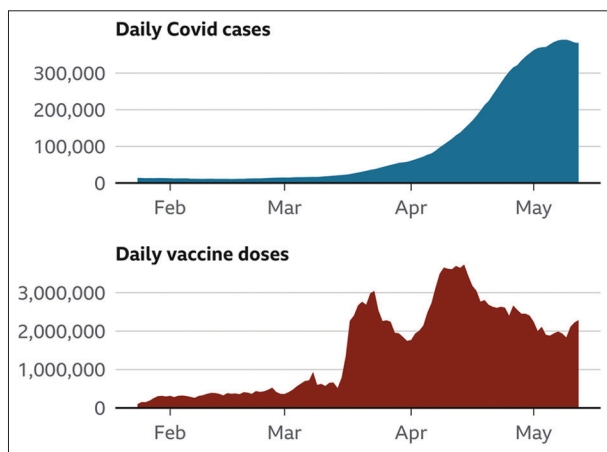


Figure 3: Trends of COVID-19 infection and vaccination in 2021. (Source: Ministry of Health and Family Welfare, India)^[3]

vaccinating only those who are likely to be exposed, for example, taxi drivers, people traveling by public transports such as buses and trains to be prioritized. In India, we started vaccinating people who are 60 years and above due to comorbidities then 45–60 years followed by children.^[4]

The other problem is in rural India, vaccination is not 100% in health care workers. In Maharashtra, only 41% of doctors have been vaccinated.

The number of COVID infections suddenly increased following a drop in vaccination as shown in Figure 3. Hence, vaccination is of prime importance at present.

Vaccination in Pregnancy

A pregnant woman, who opts for vaccination, could be vaccinated at any time of the pregnancy. To help pregnant women make an informed decision to be vaccinated, they should be provided with information about the risks of COVID-19 infection in pregnancy, the benefits of vaccination, along with the likely side effects of vaccination. This guidance note enables states to develop a counseling and vaccination plan for pregnant women. The full impact of COVID-19 disease on pregnancy outcomes for mother and fetus as well as for newborn is still unclear. Therefore, pregnant women require special considerations and systematic reporting of

adverse events following immunization (AEFI). National AEFI surveillance operational guidelines and COVID-19 vaccination operational guidelines will be four followed for AEFI surveillance related to COVID-19 vaccination of pregnant women.^[5]

As for the general population, pregnant women should avoid vaccination in the following conditions:

- Anaphylactic or allergic reaction to the previous dose of COVID-19 vaccine
- Anaphylaxis or allergic reaction to vaccines or injectable therapies, pharmaceutical products, food items, etc.

Vaccine is temporarily contraindicated in the following conditions:

1. Diagnosed COVID-19 infection – defer for 12 weeks from infection or 4–8 weeks from recovery
2. Active COVID-19 infection or COVID-19 infection treated with anti-COVID-19 monoclonal antibodies or convalescent plasma

Ultimately, the goal is to increase the speed and quantity of vaccination along with COVID appropriate protocols to prevent the third wave in India.

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