



**Research Paper**

## **The Untamed Global Devastation: Is it Due to Vaccine Failure or Unstoppable Mutation of the Virus?**

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Even if it is due to vaccine failure, we cannot blame our scientists who have toiled round the clock to give in to our pathetic appeal, “Give us some vaccine against the ferocious Covid 19. Even if it is not perfect, it doesn’t matter. We are dying”.

### **Development of Polio Vaccine**

Let us see how the polio vaccine came into the world and how much time it took to enter the mouth or arm of infants. In the 1930s, poliovirus was terrifying, as we had not known how the disease was transmitted and how it could be averted. Dr. John A. Kolmer was the first scientist to work on the vaccine for polio in 1932. Several scholars worked on developing a vaccine for polio in the USA mainly.

A breakthrough came in 1948 when a research group headed by John Enders at the Children's Hospital Boston successfully cultivated the poliovirus in human tissue in the laboratory. The first polio vaccine was an inactivated, or killed, vaccine (IPV) developed by Dr. Jonas Salk and licensed in 1955. Due to a concentrated effort to eradicate polio from the world, there were no cases of polio acquired in the United States since 1979 and nil in the entire Western Hemisphere since 1991.

Since January 2011, no occurrences of polio were reported in India, and in February 2012, it was removed from the WHO list of polio-endemic countries. In March 2014, India became a polio-free country.

### **Covid 19**

Let us now see the gamut of Coronavirus disease 2019 (Covid-19). It is a contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It first appeared in Wuhan, China, in December 2019. The disease has since spread worldwide, leading to an ongoing terrific pandemic.

Symptoms of Covid-19 are variable but often include fever, cough, headache, fatigue, gasping difficulties, and loss of smell and taste. Symptoms may begin one to fourteen days after exposure to the virus. At least a third of people who are infected do not develop noticeable symptoms. Of those who develop symptoms noticeable enough to be classed as patients, most (81%) develop mild to moderate symptoms (up to mild pneumonia). However, 14% develop severe symptoms (dyspnea, hypoxia, or more than 50% lung involvement on imaging), and 5% suffer precarious symptoms (respiratory failure, shock, or multiorgan dysfunction). Older people are at a higher risk of developing severe symptoms. Some continue to experience a range of effects (long Covid) for months after recovery, and damage to organs has been found.

Covid-19 transmits when people breathe in air contaminated by droplets and tiny airborne particles. The transmission also occurs if splashed or sprayed with contaminated fluids in the eyes, nose, mouth, and, rarely, via contaminated surfaces. People remain contagious for up to 20 days and can spread the virus even if they do not develop any symptoms.

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Preventive measures include physical or social distancing, quarantining, ventilation of indoor spaces, covering coughs and sneezes, hand washing, and keeping unwashed hands away from the face. The use of face masks or coverings has been recommended in public settings to minimize the risk of transmissions.

Some of the potential consequences of emerging variants are the following.

- Increased transmissibility
- Increased morbidity
- Increased mortality
- Ability to evade detection by diagnostic tests
- Decreased susceptibility to antiviral drugs
- Decreased susceptibility to neutralizing antibodies, either therapeutic (e.g., convalescent plasma or monoclonal antibodies) or in laboratory experiments
- Ability to evade natural immunity (e.g., causing reinfections)
- Ability to infect vaccinated individuals
- Risk of particular conditions such as multisystem inflammatory syndrome or long Covid.
- Affinity for particular demographic or clinical groups, such as children or immunocompromised individuals.

Variants that meet one or more of these criteria may be labeled "variants under investigation" or "variants of interest" pending verification and validation of these properties. After confirmation and acceptance, they would be called "variants of concern."

The WHO has classified the existing variants of concern into Alpha (lineage B.1.1.7), Beta (lineage B.1.351), Gamma (lineage P.1), and Delta (lineage B.1.617.2) as under:

#### **Alpha (lineage B.1.1.7)**

This variant was first noticed in the UK in October 2020. Since December 2020, its prevalence odds have doubled every 6.5 days, the presumed generational interval. This variant had shown a significant increase in the rate of Covid-19 infection in the United Kingdom. There was some evidence that there was 40–80% increased transmissibility. By May 2021, the Alpha variant has been detected in some 120 countries.

#### **Beta (lineage B.1.351)**

This variant was first detected in South Africa on 18 December 2020. The WHO had labeled this as the Beta variant. Researchers and officials reported that the prevalence of the variant was higher among young people with no underlying health conditions. Compared to other variants, this variant spread faster. Scientists noted that the variant contains several mutations that allow it to attach more readily to the human spike glycoprotein of the virus, N501Y. The United Kingdom has also witnessed the N501Y metamorphosis.

#### **Gamma (lineage P.1)**

The Gamma variant or lineage P.1 was termed a Variant of Concern by the WHO on 21 January 2021. The National Institute of Infectious Diseases (NIID), Tokyo first spotted this variant on 6 January 2021 in four people arrived from Brazil. But the new variant was absent in samples collected from March to November 2020 in Brazil. It was again detected in 42% of the specimens from 15–23 December 2020, followed by 52.2% during 15–31 December and 85.4% during 1–9 January 2021. A study found that infections by Gamma can produce nearly ten times more viral load compared to the other lineages identified in Brazil (B.1.1.28 or B.1.195). Gamma also showed 2.2 times higher transmissibility with the same ability to infect both adults and older persons, suggesting P.1 and P.1 like lineages are more capable at infecting younger humans irrespective of sex. A study of samples collected in Manaus, Brazil, between November 2020 and January 2021 indicated that it could evade 25–61% of inherited immunity from previous coronavirus diseases, leading to the possibility of reinfection after recovery from an earlier Covid-19 illness. As for the fatality ratio, infections by Gamma were also 10–80% more lethal.

#### **Delta (lineage B.1.617.2)**

Descendant of lineage B.1.617, which includes the Kappa variant, was first located in October 2020 in India and has since spread internationally. This variant spreads more quickly than the original version of the virus and could roll-out as fast as Alpha. Presently this variant is causing havoc in most countries. This variant is occurring in the fully vaccinated also.

Another variant of Delta with the K417N mutation that appeared in June 2021 is also present in the Beta and Gamma variants. The "Delta with K417N" by Public Health England has been nicknamed "Delta Plus." On 22 June 2021, India's Ministry of Health and Family Welfare declared the "Delta plus" a variant of concern after 22 cases occurred in India. After the announcement, leading virologists said insufficient data was available to support labeling the variant as a distinct variant of consequence, pointing to the small number of patients studied.

#### **Wave-Like Pattern of Sickness**

There is no satisfactory explanation for wave-like-occurrence of the sickness from any quarter. At some point, the number of infected cases go up suddenly and steeply and remain there for some time and climb down suddenly and steeply. This is termed a wave and happened in most countries. India has experienced a second wave recently. During this period, there was utter chaos in the country. The hospitals were overwhelmed, there was an acute shortage of oxygen and ICU beds, and total mayhem. The nation is expecting a third wave shortly, as envisaged by the so-called experts and preparing for it suitably. The mathematicians are also drawing models

suggesting the number of cases the country would face at different times. Of course, the ordinary man cannot fathom these models.

### **Long Covid**

Long Covid-19 refers to when people continue to experience symptoms of Covid-19 and do not fully recover for several weeks or months after the start of their symptoms. Some research suggests that people with mild cases of Covid-19 usually recover within 1–2 weeks of contracting the initial SARS-CoV-2 infection. For severe cases of Covid-19, recovery can take six weeks or longer.

Currently, some researchers may define post-acute Covid-19 as symptoms extending beyond three weeks since onset and chronic Covid-19 as symptoms extending beyond 12 weeks since onset. Other researchers refer to long Covid as Covid-19 symptoms that last for longer than two months.

Although it is still unclear how many people have experienced long Covid, data from the Covid Symptom Study app suggest that 1 in 10 people with the illness experience symptoms for three weeks or longer. Data from the United Kingdom's Office for National Statistics found similar results, with roughly 1 in 10 respondents who tested positive for Covid-19 exhibiting symptoms lasting for 12 weeks or longer. This means that across the world, there may be more than 5 million cases of long Covid.

### **Transmission**

Dr. Randeep Guleria, Director, AIIMS, New Delhi, tells the Times of India that there was not enough data at the moment to support the requirement for a third or booster dose. "By now, we know that vaccines cannot prevent transmission of the infection. They protect against severe disease and mortality. Two doses of all vaccines available currently are sufficient to achieve that." he explained. It is an important revelation.

Herd immunity is not a possibility with the current spread of the Delta variant. It is still infecting vaccinated individuals, says Andrew Pollard, the head of the Oxford Vaccine Group.

Pollard, working on the Oxford-AstraZeneca Covid-19 vaccine, added that unlike measles — where 95% vaccination of the population would stop transmission — the same could not be said for coronavirus spread by the Delta variants. Given the circulation of the highly transmissible Delta variant, vaccination would not stop spread altogether.

In the United States, 49% are fully vaccinated by 12 August 2021, as planned well in advance. On the same day, the new cases of Covid 19 are more than 186,000.

The search for a vaccine against SARS-CoV2 has been going on at a break-neck pace resulting in almost a breakthrough in vaccine development by several research institutions and vaccine manufacturers. More and more people are becoming skeptical looking at the number of fully vaccinated people getting infected. However, in a pandemic situation, the vaccine development process, including clinical trials, got shortened and fast-tracked to 15-18 months. More than 164 candidate vaccines are under development, and among them, 24 vaccines are in advanced stages of development.

Vaccine development has been a remarkable effort whereby the mRNA-1273 (Moderna) and BNT162b2 (Pfizer-BioNTech) vaccines showed the required efficacy, and the US Food and Drug Administration (USFDA) has approved them for emergency use initially. More vaccines like Sputnik, Johnson & Johnson are being pushed into the market.

Some drugs have emerged with promising results, among which remdesivir and arbidol are with satisfactory clinical progress. A plethora of drugs for the treatment of the disease came into use somewhat hastily. But many of them have been withdrawn, having failed to treat the Covid patients. Remdesivir, which was considered a magic wand in the hands of clinicians, had also to be pulled out.

A growing number of countries are considering switching to different Covid-19 vaccines for second doses or booster shots, being unhappy with the first dose.

### **Breakthrough Infections and Vaccine Efficacy**

Breakthrough infection refers to cases in which a person vaccinated against COVID-19 nonetheless becomes infected with the virus again. The amount of virus that is in an infected person is viral load. High viral loads are concerning because they can mean the person is more infectious. Breakthrough infections are saving the skin of some of the inferior vaccines.

A small percentage of people fully vaccinated against Covid-19 will still develop the disease. It is because no vaccine has 100% efficacy. This means that vaccinated people are much less likely to get sick and it does happen in some cases. It is also possible that some fully vaccinated people might have infections but not have symptoms (asymptomatic infections). Experts continue to study how common these cases are.

Vaccine efficacy is the percentage reduction in disease in a group of people who received a vaccination in a

clinical trial. It differs from vaccine effectiveness, which measures how well a vaccine works when given to people in the community outside of clinical trials. When we say that a particular vaccine has 60% efficacy, 60% of the people in a controlled group in a study do not get infected, and 40% will get infected. Large-scale clinical studies found that Covid-19 vaccination prevented most people from getting Covid-19. Research also provides growing evidence that mRNA Covid-19 vaccines (Pfizer-BioNTech, Moderna) offer similar protection in real-world conditions.

It is possible a person could be infected just before or just after vaccination and still get sick. It typically takes about two weeks for the body to build protection after vaccination, so a person could get sick if the vaccine has not had enough time to provide protection.

If you get Covid-19 after vaccination, your symptoms might be less severe. There is some evidence that vaccination may make the illness less acute in people who get vaccinated but still get sick. Despite this, some fully vaccinated people will still be hospitalized and die.

Covid-19 vaccines are an essential tool to help protect people against Covid-19 illness, including new variants, but this is not happening.

Covid-19 vaccines help protect people vaccinated from getting Covid-19 or getting severely ill from Covid-19, including reducing the risk of hospitalization and death. Studies show that fully vaccinated people can be less likely to spread the virus to others, even if they get Covid-19.

### **The Crux of the Matter**

Here comes the question mark on the vaccines developed. We have said how many new cases are occurring daily in the USA and how many are fully vaccinated. The USA is a very advanced country, and it can administer the vaccines properly and keep all the data meticulously. Not only in the USA but in most other countries the reinfections or the breakthrough infections are having a field day causing desperation.

Then, can we or can we not say that the global devastation is due to the failure of vaccines, at least to some extent? As of 9 August 2021, more than 166 million people in the United States have been fully vaccinated, of the total population of about 330 million. Among these, nearly 200,000 new cases are coming to light every day. One can understand if there are a few thousand breakthrough cases per day in a population of about 330 million. But it is beyond one's comprehension that more than a hundred thousand cases should occur daily. In the US new cases of infection on 26 October 2021 is 87,358 with a weekly average of 70,824.

Like with other vaccines, Covid 19 vaccine breakthrough cases will occur, even though the vaccines are working as expected, but the rate at which it is happening is astonishing. Asymptomatic infections among vaccinated people could also be overwhelming.

For some vaccines, the efficacy reported could be an exaggerated one. It could be intentional for commercial reasons or accidental. In most cases, thousands of people undergo clinical trials. Because of the lack of an adequate number of qualified personnel, semi-qualified persons are employed. It is so, particularly in developing countries. So how do they do their job is anyone's guess.

Recording the data and its analysis are the other weak links in giving the vaccine to the users. Another interesting fact is that the vaccine developers or manufacturers revise the vaccine's efficacy upwards when the vaccine is underused, and no further scientific work is out. The intention of such a revision is not clear.

### **Herd Immunity**

Herd immunity requires a certain percentage of people to be infected or vaccinated to stop the spread, but experts say it depends on the herd or community, as well as its density, the number of susceptible people, and other factors.

According to the research conducted by Imperial College, London and published in *The Lancet* in November last year, for a vaccine to provide life-long immunity against Covid-19, 60%-72% of the population needs to be inoculated to offer herd immunity.

However, with an efficacy of 80%, a vaccine needs to be administered to 75%-90% of the population in order to generate herd immunity — which is an extremely high number. While the efficacy of most vaccines on offer today ranges between 50% and 97%, their efficacy in preventing people from becoming asymptomatic carriers of the virus is still unknown.

At this time, we are at a loss to say accurately whether the failure of vaccines or mutation of the virus is solely responsible for the leaps and bounds the virus is exasperating. Both are collaborating to devastate humanity which has achieved thumping progress in every field. We have to see what our children will inherit from us.

### **The Bottomline**

WHO says amply: “Temporary measures such as lockdowns, border closures, and travel restrictions can at best lead to disease elimination, not eradication. However, sustaining that becomes a challenge as newer variants emerge and people long for a return for pre-pandemic normalcy. Like all pandemics, this one will come to an

end too. The end, however, would not be an elimination of the coronavirus, or even a scenario where we have reached herd immunity to practically halt the transmission. Scientists say Covid-19 could become seasonal. That is to say, the coronavirus will become endemic.”

*The writer is an Indian Army veteran and a passionate student of Sociology, with a Ph.D. degree in the subject. Published several books and articles in the newspapers.*