

Delta Variant - transmission and its consequences in India.

Dr. K.E. Chaudhary

Associate professor in Zoology, Matoshree Vimalabai Deshmukh Mahavidyalaya, Amravati (M.S.) India

Email: kumudchaudhary0@gmail.com | +91-9420714278

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Abstract

Viruses constantly change through mutation. A variant has one or more mutations that differentiate it from other variants in circulation. As expected, multiple variants of SARS-CoV-2 are documented globally throughout this pandemic. To inform local outbreak investigations and understand national trends, scientists compare genetic differences between viruses to spot variants and the way they're associated with one another. Delta variant, also referred to as lineage B.1.617.2 and Indian variant may be a variant of lineage B.1.617 of SARS-CoV-2, the virus that causes COVID-19. It was first detected in India in late 2020. The World Health Organization named it the Delta variant on 31 May 2021 First identified in India, Delta Plus has now been found in the U.S., U.K., and nearly a dozen other countries. India has labeled it a variant of concern, but the Center for disease control and prevention of U.S health department and WHO haven't. The Delta variant, also referred to as B.1.617.2, can spread more easily, consistent with the U.S. Center for Disease Control and prevention. The strain has mutations on the spike protein that make it easier for it to infect human cells. That means people could also be more contagious if they contract the virus and more easily spread it to others. It is now the dominant strain within the U.S. The Delta variant causes more infections and spreads faster than earlier sorts of the virus that causes COVID-19. It might cause more severe illness than previous strains in unvaccinated people. In fact, researchers have said that the Delta variant is about 50% more contagious than the Alpha variant, which was first identified within the U.K., consistent with The Washington Post. Alpha, also referred to as B.1.1.7, was already 50% more contagious than the first coronavirus first identified in China in 2019. Public health experts estimate that the typical one that gets infected with Delta spreads it to 3 or 4 people, as compared with one or two people through the original Corona virus strain, consistent with Yale Medicine. The Delta variant can also be ready to escape protection from vaccines and a few COVID-19 treatments, though studies are still ongoing. Scientists are still tracking the info to work out how deadly it's. Based on hospitalizations within the U.K., the Delta variant does seem to be more likely to steer to hospitalization and death, particularly among unvaccinated people, consistent with a recent study published in The Lancet. Now vaccine makers are testing booster shots to seek out if they will better protect against the Delta variant and other variants that emerge in coming months. Covid-19 cases, symptoms of Delta tend to be a touch different than other strains, but that doesn't necessarily mean the associated symptoms are more severe.

Fever, headache, pharyngitis and runny nose are common, while cough and loss of smell aren't. Other reports link Delta to more serious symptoms, including hearing disorder, severe gastrointestinal issues and blood clots resulting in tissue death and gangrene. Research is ongoing to work out if Delta infection is related to increased hospitalization and death. One early study assessing the risk of hospital admission in Scotland reported that hospitalization is twice as likely in unvaccinated individuals with Delta than in unvaccinated individuals with Alpha. Therefore as it is the variant of concern in India so the present study is aimed to discuss the virus transmission and prevention thoroughly.

Keywords :-Delta Variant, Transmission, prevention.

1. Introduction

The Delta variant was behind the deadly second wave of the coronavirus in India that killed thousands and infected lakhs during March to May. Viruses have tendency to change through mutations which leads to the formation of a variant of the respective Virus. A variant has one or more mutations that differentiate it from other variants of the virus in circulation. So during the Covid-19-pandemic, as it was expected, multiple variants of SARS-CoV-2 have been documented in India and globally. To inform local outbreak investigations and understand national trends, scientists compare genetic differences between viruses to identify variants and how they are related to each other. The World Health Organization (WHO) classifies variant viruses as Variants Of Concern (VOC) and Variants of Interest (VOI); classifications made by certain country of the virus may differ from those of WHO because the importance of variants may differ by location. To assist with public discussions of variants, WHO proposed using labels consisting of the Greek Alphabet, e.g., Alpha, Beta, Gamma, as a practical way to discuss variants by non-scientific audiences.

Delta variant, also known as lineage B.1.617.2 and Indian variant is a variant of lineage B.1.617 of SARS-CoV-2, the virus that causes COVID-19. It was first detected in India in late 2020. The World Health Organization named it the Delta variant on 31 May 2021. First identified in India. India has labeled it a Variant Of Concern (VOI), but the Center for disease control and prevention of U.S. health department and WHO

haven't. The Indian SARS-CoV-2 Genomics Consortium (INSACOG), jointly initiated by the Union Ministry of Health and the Department of Biotechnology (DBT) with the Council for Scientific and Industrial Research (CSIR) and the ICMR, is a consortium of 28 national laboratories to monitor the genomic variations in SARS-CoV-2.

The Delta variant, can spread more easily, according to the U.S. Center for Disease Control and prevention. The strain has mutations on the spike protein that make it easier for it to infect human cells. That means people may be more contagious if they contract the virus and more easily spread it to others. It is now the dominant strain in the U.S. The Delta variant causes more infections and spreads faster than earlier forms of the virus that causes COVID-19. It might cause more severe illness than previous strains in unvaccinated people. In fact, researchers have said that the Delta variant is about 50% more contagious than the Alpha variant, which was first identified in the U.K., according to The Washington Post. Alpha, also known as B.1.1.7, was already 50% more contagious than the original corona virus first identified in China in 2019.

Discussion

The Delta variant was first identified in India in December 2020 and led to major outbreaks in the country. It then spread rapidly and is now reported in 104 countries, according to a CDC tracker. [1] Public health experts estimate that the average person who

gets infected with Delta spreads it to three or four other people, as compared with one or two other people through the original coronavirus strain [2]. The Delta variant may also be able to escape protection from vaccines and some COVID-19 treatments, though studies are still ongoing. Scientists are still tracking the data to determine how deadly it is. Based on hospitalizations in the U.K., the Delta variant does seem to be more likely to lead to hospitalization and death, particularly among unvaccinated people [3]. The Delta variant is believed to have fueled the second wave of COVID-19 infections in India in April-May. That surge saw up to 400,000 people infected in the country, and for a while it claimed about 4,000 lives per day [4]. While the second wave has waned and much of India has returned to a degree of normalcy, with lockdowns lifted and large crowds back in the streets and markets. There is currently no evidence of any new Delta sub-lineage that is of greater concern than Delta. According to INSACOG; Delta continues to be the dominant lineage for new cases across all parts of India in recent samples and remains the most rapidly rising lineage globally that is responsible for multiple outbreaks, including across Southeast Asia, which shows the fastest growth in new cases globally. COVID-19 cases, symptoms of Delta tend to be a little different than other strains, but that does not necessarily mean the associated symptoms are more severe. Fever, headache, sore throat and runny nose are common, while cough and loss of smell are not. Other reports link Delta to more serious symptoms, including hearing impairment, severe gastrointestinal issues and blood clots leading to tissue death and gangrene.

One early study assessing the risk of hospital admission in Scotland reported that hospitalization is twice as likely in unvaccinated individuals with Delta than in unvaccinated individuals with Alpha the variant of concern in India (VOI). Covid-19 remains a mild disease in the vast majority of children, and there's no evidence that Delta is changing that. Regions with high vaccination and strong public health measures, such as Singapore, continue to do well.

A study by the Indian Council of Medical Research (ICMR) has confirmed that most of the clinical cases in

vaccine breakthrough were infected with the Delta variant but only 9.8 per cent cases required hospitalisation, while fatality was found to be restricted to 0.4 per cent. The data for higher infectivity of Delta continues to grow with the secondary attack rate in household contacts being almost double for Delta, when compared to Alpha (Public Health England, July 9 update). The other VoC continue to be very low in India and are declining relative to Delta globally.

According to INSACOG- the Indian SARS-CoV-2 Genomics Consortium, the efforts taken to reduce transmission and vaccination remain critical in respect to the Public measures in India. A growing spectrum of mutations is seen in the Delta background in the UK, the US and India. The most frequent spike protein mutations, other than K417N (AY.1/AY.2), seen in the UK are G446V and P251L. In India, A222V and K77T have been reported as possible markers of sub-lineages. The Delta variant has mutations in its spike protein, which helps it bind to the ACE2 receptors present on the surface of the cells more firmly, making it more transmissible and capable of evading the body's immunity. Previous research into the A222V mutation for either transmissibility or immune escape was negative. In case of the K77T mutation, it has previously been reported in a cluster of Delta that spread to Asiatic lions in a zoo, and seen in sequences from Tamil Nadu, but has no known impact on transmission or immune escape in humans.

The Indian SARS-CoV-2 Genomics Consortium (INSACOG), jointly initiated by the Union Ministry of Health and the Department of Biotechnology (DBT) with the Council for Scientific and Industrial Research (CSIR) and the ICMR, is a consortium of 28 national laboratories to monitor the genomic variations in SARS-CoV-2. The Delta variant was primarily responsible for the second wave of COVID-19 in the country, accounting for over 80 per cent of new cases according to Dr. N. K. Arora, co-chair of Indian SARS-CoV-2 Genomics Consortium, the cases may go up if a new, more infectious variant comes. The variant is also around 40-60 percent more transmissible than its predecessor, Alpha variant, and has already spread to

more than 80 countries, including the UK, the US and Singapore.

The Delta Plus variant AY.1 and AY.2 has so far been detected in 55-60 cases across 11 states, including Maharashtra, Tamil Nadu, and Madhya Pradesh and is still being studied for its transmissibility, virulence, and vaccine escape character. It emerged in Maharashtra and travelled northwards along the western states of the country before entering the central and the eastern states. There are studies that show that there are some mutations in this variant that promote syncytium formation. Besides, on invading a human cell, it replicates faster. It leads to a strong inflammatory response in organs like the lungs. However, it is difficult to say that disease due to delta variant is more severe. The age profile and the deaths during the second wave in India were quite similar to that seen during first wave. The Delta Plus variant AY.1 and AY.2 has so far been detected in 55-60 cases across 11 states, including Maharashtra, Tamil Nadu, and Madhya Pradesh. AY.1 is also found in countries like Nepal, Portugal, Switzerland, Poland, Japan but AY.2 is less prevalent. The variant is still being studied for its transmissibility, virulence, and vaccine escape characteristics.

On some parts of the country still witnessing a spurt in the number of cases, though there is a significant dip in the number of cases in most parts of the country, some regions are witnessing a high-Test Positivity Rate (TPR) particularly in the north-eastern part and several districts in the southern states, most of these cases could be due to the Delta variant.

A virus begins infecting a part of the population, which is most susceptible and also exposed to the infection. It diminishes after it successfully infects a large proportion of the population and strikes back when the immunity developed in the people post-natural infection fades. There may be seen rise in number of cases if a new, more infectious variant comes. In other words, next wave will be driven by a virus variant to which significant proportion of population is susceptible. And any future waves will be controlled and delayed if more and more people get vaccinated and most importantly,

people follow COVID-Appropriate Behaviour effectively, especially till a substantial part of our population gets vaccinated.

People need to focus on vaccination and adherence to Covid appropriate behaviour to manage COVID-19. Therefore, there is a need to keep a strict vigil on the emergence of variants of concern and outbreaks so that they can be contained before they spread to a larger region.

The Indian SARS-CoV-2 Genomics Consortium (INSACOG) is a consortium of 28 laboratories for whole genome sequencing in the context of COVID-19 pandemic and was established on December 26, 2020 for India. The idea is to have a strong network of laboratories to do genomic surveillance of the SARS-CoV-2 and correlate whole genomics sequencing (WGS) data with clinical and epidemiological data to see whether or not a variant is more transmissible, causes more severe disease, escaping immunity or causing breakthrough infections, affecting vaccine efficacy, and diagnosed by current diagnostic tests.

The National Center for Disease Control (NCDC) analyses this data. The entire country has been divided into geographical regions and each lab is given the responsibility of one particular region. There are formed near about 180 -190 clusters in country. Regular random swab samples and samples of patients who develop severe illness, vaccine breakthrough infections, and other atypical clinical presentations, are collected and sent to regional laboratories for sequencing. The current capacity of the country is to sequence over 50,000 samples per month.

The new mutations/variants of concern are cultured and scientific studies are undertaken to see the impact on infectiousness, virulence, vaccine efficacy and immune escape properties. Children have a more robust innate immune response than older adults. That typically enables kids to successfully counter the infection before it's had a chance to spread to the lungs to cause pneumonia and the inflammatory cascade that can be life-threatening in seniors. It's also possible that

the routine pediatric immunizations that younger children receive boost their innate immune response.

The Delta variant is inherently more transmissible and, therefore, will be more contagious between children, between adults, and between adults and children and vice versa. Studies and modelling of transmission patterns indicate that younger children and adolescents play a lesser role in spreading SARS-CoV-2 at a population level, and that prioritising vaccination in older age groups yields more population-level protection against Covid. Symptoms of the Delta variant are similar to those seen with the original corona virus strain and other variants, including a persistent cough, headache, fever, and sore throat [5]

At the same time, COVID-19 patients in the U.K. have reported that some symptoms are slightly different for Delta, according to data from the ZOE COVID Symptom Study [6]. Cough and loss of smell seem to be less common. Headache, sore throat, runny nose, and fever seem to be more common.

Scientists are still tracking the data to determine how deadly it is. Based on hospitalizations in the U.K., the Delta variant does seem to be more likely to lead to hospitalization and death, particularly among unvaccinated people. People who haven't been fully vaccinated against COVID-19 are most at risk.

Kids and younger adults who haven't been vaccinated may be susceptible as well. In the U.K., children and unvaccinated adults under age 50 were 2.5 times more likely to become infected with Delta, according to a recent study published by Imperial College London. [7] Scientists are looking at how the Delta variant can cause breakthrough cases, or infections among people who are fully vaccinated. So far, they seem to be rare.

A consortium of Indian labs involved in genome sequencing to identify and track the spread of various corona virus variants told the government that Delta Plus appears to have three worrying characteristics: Increased transmissibility; more capacity to attack lung cells; and a potential reduction in monoclonal antibody response — or, put simply, possible resistance to

vaccines and immunity gained through previous infection.

According to Epidemiologists the focus should be on gathering more data through by the use of rapid sequencing and solid epidemiological research experts are already warning about a possible third wave within weeks. As the data accumulated for the Delta plus variant is not enough to decide called Delta Plus as being more dangerous or concerning than the original Delta variant [8]

India has worked recently to accelerate its vaccination program, but a large share of its 1.3 billion people, including all minors who aren't yet eligible for shots, would still be vulnerable to another wave of infections. Nearly 7 million cases were reported for the month of May and Maharashtra being the epicenter for the second wave, where is situated the economic capital of India went into Lockdown To break the chain . and the vaccination for elders more than 45 years was started and then in the month of May it was opened to anyone elder than 18 year.

But then country faced the shortage of Vaccine doses. So the vaccine production capacity was increased to 100 million doses from 70 million doses of Covishield Vaccine by Serum Institute of India. The fear is that the spread of Delta Plus, or any other new variants, could make things worse, and fast but the government's own COVID-19 experts have insisted that there's no need to panic.

Conclusion

Though there was crisis during the second wave of Covid-19 by delta Variants in India. Vaccines are effective against these variants and effective therapeutics are available as Indian Government look in to the Health facilities and increased the number of health facilities continues to monitor all variants circulating within the country and also applied countrywide restrictions which helped to bring down the no cases.

The Delta variant causes more infections and spreads faster than earlier forms of the virus that causes COVID-19. It might cause more severe illness than previous strains in unvaccinated people. Vaccines continue to reduce a person's risk of contracting the virus that cause COVID-19, and also continue to be highly effective at preventing hospitalization and death, including against this variant. Fully vaccinated people with breakthrough infections from this variant appear to be infectious for a shorter period. So Get vaccinated and wear masks indoors and in public spaces to reduce the spread of this variant.

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