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Review Article

A Review On: Recent Coronavirus Variant: - JN.1

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ABSTRACT

SARS COV-2 is among the most severe global threats humanity has ever encountered due to its virulence and impact on susceptible ,Populations, the world health. Organization has officially classified variants as variants of concern or variants of interest, considering the low proofreading Capacity and error prone mechanism. OF RNA dependent RNA polymerase the covid pandemic, the fifth since the 1918 Flu Pandemic, originated in Wuhan, china and swiftly became a global health crisis. The virus, officially named SARS. COV-2, emerged from an animal coronavirus and acquired human to human transmission capabilities .These highly contagious virus spreads rapidly, constantly evolving with in the Population.This revival explorer the Fundamental characteristics, potential origin, and review of the novel coronavirus: J.N.1.

INTRODUCTION

The World Health Organization has added a new covid-19 strain, JN.1, to its list of "variants of interest," its second highest level of monitoring. It self an offshoot of the omicron subvariant BA.2.86 (nicknamed "Pirola" by the media),1 JN.1 is described by WHO as posing a "low" risk to global public health. The agency warned, however, that the winter season in the northern hemisphere could increase the burden of respiratory infections in many countries. Having made up just 3% of infections in early November, JN.1 is now responsible for over 27%, WHO said. JN.1 was first detected in 12 countries in September, the highest proportions being in Canada, France, Singapore, Sweden, the UK, and the US. The UK Health Security Agency has told the BBC that JN.1 is found in about 7% of the positive covid-19 tests analysed. Data from the US Centers for Disease Control and Prevention (CDC) show that JN.1 is the fastest growing covid strain in the US, responsible for 15-29% of new covid infections. It is already the dominant strain in the north east of the US, where it is responsible for a third of all

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cases. T Ryan Gregory, an evolutionary biologist at the University of Guelph in Canada, told CNN, "It's already pretty clear that it is highly competitive with existing XBB variants and looks like it's on track to become the next sort of globally dominant.

Group Of Variants

Fig No - 1

1. Where did JN.1 come from, and how is it different?

The JN.1 strain surfaced in the U.S. in September. It is a close relative of BA.2.86 (informally referred to as "Pirola"), a lineage of the Omicron variant that the CDC has been tracking since August. (While the Omicron variant, which first took hold in the U.S. in 2021, has had multiple descendants, the original strain is no longer in circulation.)[1] A difference between BA.2.86 and JN.1 is that the latter has one mutation in its spike protein, a single change that may or may not alter any of the traits that characterize the virus, although preliminary research shows that it may provide extra immune evasion.

2. What do we know—and not know—about JN.1?

Although there is not yet enough evidence to say anything definitively, JN.1 does not seem to cause more cases of severe disease or symptoms that differ from those associated with previous strains. The CDC has noted that COVID symptoms generally tend to be similar across variants, and symptoms and severity are usually more dependent on the person's immunity than they are on the variant.[2] One remarkable aspect of JN.1 is its rapid evolution. After its first documented appearance in the U.S. in September, JN.1 went from accounting for 3.5% of COVID cases in mid-November to a little more than 21% about a month later in December before rising to over 85% in the third week of January, according to CDC Estimates[3]. At the same time, despite a recent uptick in COVID cases, it's hard to tell whether JN.1 is responsible for it. The CDC anticipated an increase in cases of COVID and other respiratory diseases this fall and winter based on previous patterns[4].

3. How can people protect themselves against these new coronavirus subvariants?

Anticipation of three viruses—SARS-CoV-2, influenza, and RSV—hitting around the same time in the fall and winter has contributed to fears of a "tripledemic" in recent years[5]. This season, vaccines are available to help protect against all three of these illnesses. Updated flu and COVID shots are available to everyone ages 6 months and older. And new RSV preventions are given to the most vulnerable populations and include two vaccine choices for adults 60 and older. There is

also a monoclonal antibody for infants and toddlers and a vaccine given to pregnant women to provide antibodies that will help protect their newborn infants from RSV from birth to 6 months. Updated COVID vaccines that became available this fall are expected to increase protection against JN.1. What's more, COVID tests should be able to detect JN.1 and other strains, and antiviral treatments should remain effective against these variants, according to the CDC[6-7]. Protective efforts can help as well. These include staying away from people who are sick, strategic masking when among people in confined spaces, hand-washing, improving ventilation, and staying aware of COVID transmission levels in your area[8].

What's happening now with this variant?

The increase in the number of cases caused by JN.1 corresponds to an overall increase in COVID-19 cases. Symptoms of JN.1 infection are very similar to those of previous omicron variants, and it doesn't seem to cause more severe disease, either. There is some suggestion that JN.1 may be causing more diarrhoea than previous variants, but we don't have any firm data supporting that yet[9].

What's most important to understand about this variant?

This latest variant should be a reminder that we have tools to fight off COVID infection and minimize severe disease: Tests detect JN.1, the new vaccines protect against severe disease, and antivirals are still capable of treating infection from JN.1. We just have to use these tools more effectively than we have over the last six months.

So far, only 8% of children and 19% of adults have received the latest vaccine, so a lot of people are missing out on protection from this virus[10-11].

What does the transmission timeline look like for JN.1?

The period of infectiousness for JN.1 is very similar to that of the other omicron variants that have been circulating over the past year: You are contagious one to two days before your symptoms begin, and you are still contagious for at least two to three days after your symptoms begin—though some people can continue to have the detectable live virus for up to a week after symptom onset. After exposure, it may take five days or more before you begin to develop symptoms[12].

Are people who had an older vaccine or who've had COVID from another variant likely to be reinfected by JN.1?

The older vaccines were based on SARS-CoV-2 variants that are very different from variants circulating now. That, combined with the fact that your immunity from vaccination or infection tends to drop off over time, means that you won't get a lot of protection from COVID-19 if you are relying on the vaccines, you received nearly a year ago. It's very similar to why we have annual influenza vaccines: The virus is changing, so we have to change the vaccine to make sure it is a good match with the virus variants that are causing infection right now[13].

Is Paxlovid effective against JN.1?

Paxlovid is still working very well, particularly in high-risk populations, but it's not being prescribed as frequently as it should be. It's important to remember that Paxlovid needs to be taken as soon as possible after symptoms begin, within five days of symptom onset is the guidance, but the earlier, the better. This means it is particularly important to test when you start feeling sick and then get a prescription if you test positive[14].

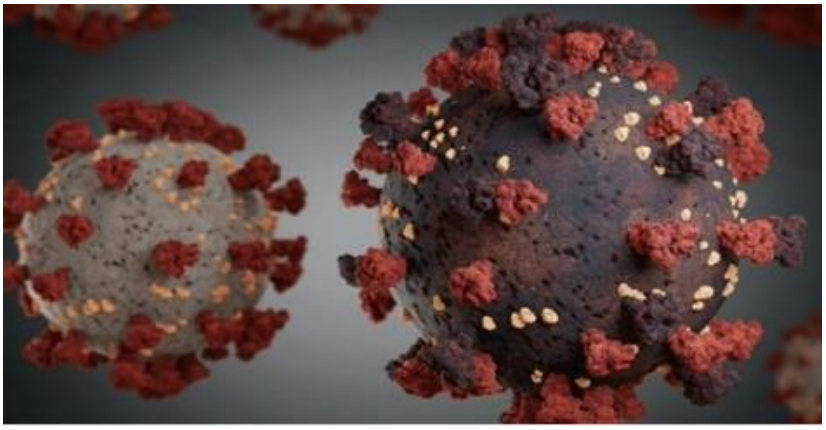

Fig No - 2

What are the symptoms of the COVID-19 variant JN.1?

JN.1 does not seem to cause more severe symptoms compared to other variants. Common symptoms reported include sore throat, nausea, and diarrhoea within a few days of the illness' onset. Loss of smell may be less frequently reported. There are a wide range of symptoms including fever, chills, fatigue, cough, muscle or body aches, and congestion[15].

Fig No - 3

1. Fever and Fatigue: Persistent fever and unexplained fatigue are common early signs.
2. Respiratory Issues: Children might experience coughing, shortness of breath, or rapid breathing. However, he says, the JN.1 subvariant does not seem to be impacting the lungs as such.
3. Gastrointestinal Symptoms: Some cases involve digestive problems such as nausea or diarrhoea.
4. Loss of Taste or Smell: This symptom, although more prevalent in adults, can also occur in infected children as well.
5. Muscle Aches and Headaches: General discomfort, muscle pain, and headaches may be present.

What Are the Preventive Measures to Control the Spread of JN.1 Covid Variant?

1. Vaccination: Encourage all eligible family members to get vaccinated, and boosted if necessary. While the vaccine may not prevent infection entirely, it significantly reduces the severity of symptoms[16].

Fig. no-4

2. Hygiene Practices: Emphasise good hygiene habits like regular handwashing with soap and water for at least 20 seconds. Alcohol-based hand sanitisers are also effective[17].

Fig. no-5

3. Masking: If your child is old enough to wear a mask comfortably, encourage its use, especially in crowded or indoor settings[18].

Fig. no-6

4. Social Distancing: Teach children the importance of maintaining a safe distance from others, especially if someone is presenting flu-like symptoms[19].

Fig. no-7

5. Ventilation: Ensure proper ventilation in indoor spaces. Open windows and doors to increase fresh air circulation[20].

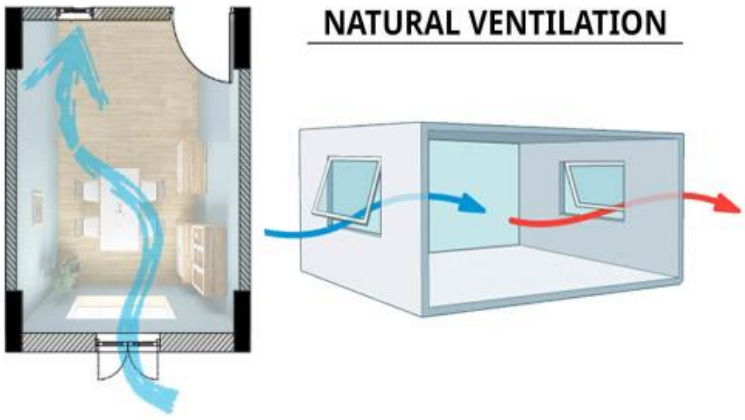

Fig. no-8

6. Regular Health Check-ups: Schedule routine check-ups with your paediatrician. Early detection can be crucial in managing the virus's impact[21].

7. Quarantine Measures: If someone in the household is infected or showing symptoms, isolate them from others, and follow recommended quarantine guidelines[22].

8. Educational Communication: Explain the situation to your child in an age-appropriate manner. Help them understand the importance of following preventive measures without causing unnecessary fear.

While the JN.1 subvariant is currently a variant of interest, staying informed and proactive is essential, especially when it comes to the health of our children[23]**.**

Diagnosis of JN.1 COVID

Diagnostic tests, including PCR and rapid antigen tests, can identify any COVID variant. However, to know if it is a JN.1 variant, genome sequencing is required[24]**.**

Fig no-9

What are treatments for the subvariant?

For people with mild to moderate infection who are not hospitalized and are at risk of severe disease or hospitalization, treatment with antivirals is recommended, similar to other variants. The first line of treatment is Paxlovid, an antiviral pill that reduces the amount of the virus that causes COVID-19 in the body and prevents symptoms from getting worse. Though the viruses are mutating, there is still data to suggest that the medication is effective. There is a lot of research happening in this space, including looking for new antiviral treatments. A question I often get asked is, “Why should I take Paxlovid, especially if I only have a mild case of COVID?” I do want to emphasize that it is still an area of important research with mixed data, but recent data suggests that there may be a benefit to reducing the risk of developing long-COVID, or post-COVID conditions, especially in individuals over age 50 and those with preexisting medical conditions. It is important to keep in mind that some patients continue to have an increased risk of progressing to more severe COVID. Paxlovid is beneficial and recommended for people over the age of 50, or for those with underlying medical conditions such as high blood pressure or diabetes who are at risk of complications from COVID-19 and hospitalization[25].

New COVID variant JN.1: Health Ministry says no need for booster dose

Serum Institute of India to begin work to bring in its vaccine specific to counter Omicron variants.

Fig. no-10

The Union Health Ministry direction that States be alert and prepared for any possible surge in COVID-19 cases following the emergence of the new variant JN.1, senior health officials said that there is no move to recommend administration of vaccine booster dose for India. India SARS-CoV-2 Genomics Consortium (INSACOG) chief N.K. Arora speaking to The Hindu on December 24 explained that there was no need for an additional fourth booster dose of vaccine against COVID-19 amid the surge in cases and the detection of the JN.1 sub-variant. "Only those over 60 years of age who have comorbidities and high risk patients in this age group can take a precautionary third dose if they have not taken one till now. As of now there is no need for a fourth dose in the general public. We would advise precaution and not panic," said Dr. Arora[26].

Virological characteristics of the SARS-CoV-2 JN.1 variant

The SARS-CoV-2 BA.2.86 lineage, first identified in August 2023, is phylogenetically distinct from the current circulating SARS-CoV-2 omicron XBB lineages, including EG.5.1 and HK.3. Compared with XBB and BA.2, BA.2.86 carries more than 30 mutations in the spike protein, indicating a high potential for immune evasion.1, 2, 3, 4 BA.2.86 has evolved and its descendant, JN.1 (BA.2.86.1.1), emerged in late 2023. JN.1 harbours Leu455Ser and three mutations in non-spike proteins (appendix pp 17–18). Spike protein mutation Leu455Ser is a hallmark mutation of JN.1: we have recently shown that HK.3 and other flip variants carry Leu455Phe, which contributes to increased transmissibility and immune escape ability compared with the parental EG.5.1 variant.5 Here, we investigated the virological properties of JN.1. We estimated the relative effective reproductive number of JN.1 using genomic surveillance data from France, the UK, and Spain, where more than 25 sequences of JN.1 have been reported, using a Bayesian multinomial logistic model (appendix pp 10–15, 17–18).6 The reproductive number of JN.1 in these three countries was higher than that of BA.2.86.1 and HK.3, one of the XBB lineages with the highest growth advantage at the end of November, 2023 (appendix pp 17–18).5 These results suggest that JN.1 might soon become the dominant lineage worldwide. Indeed, by the end of November 2023, JN.1 had already overtaken HK.3 in France and Spain (appendix pp 17–18). Taken together, these results suggest that JN.1 is one of the most immune-evading variants to date. Our results suggest that Leu455Ser contributes to increased immune evasion, which partly explains the increased reproductive number of JN.1. KJI and KS are supported in part by AMED SCARDA Japan Initiative for World-leading Vaccine Research and Development Centers UTOPIA and

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Delhi Reports First Case of JN.1 Variant Infection: Govt

The national capital has reported the first case of JN.1 variant infection, said Delhi Health Minister Saurabh Bharadwaj. "Delhi has reported the first case of JN.1, a Sub-variant of Omicron. Out of the 3 samples sent for Genome Sequencing, one is JN.1 and the other two are Omicron," Bharadwaj told ANI. Meanwhile, a total of 109 JN.1 Covid variant cases have been reported in the country as of 26 December, Health Ministry sources said on Wednesday. Amid rising concerns over the emergence of the new variant of the coronavirus, Dr Bobby Bhalotra, Vice Chairman of the Department of Chest Medicine, Gangaram Hospital, said, "The new variants are so far mild; they are from the family of the Omicron virus. So, the cases are not too much to be worried about; there is no panic as such but yes, it is a sign that it has returned. It may flourish because it is more infectious than the normal Covid virus, so we must start taking precautions. Precaution and prevention are better than cures. Take precautions so that doesn't spread for them." "There is an increase in cases of respiratory illness in OPD of 20-30 per cent due to weather changes, viral illness and an increase in pollution in the national capital," he added. He further said that patients who already have Asthma, interstitial lung disease, or COPD are getting exacerbations mostly from various viruses, including the H1N1 virus or swine flu. "Despite having a vaccine against these viruses, especially H1N1, people are not getting themselves inoculated in time, and the immune system, which can be prevented by taking a vaccine, is not being used by many patients. So, this increasing worsening of breathing problems is due to viruses and more because of pollution. Pollution in our city is very high. And that impacts the lungs of patients, especially those with asthma, bronchitis, and interstitial lung disease. So that's another reason why the number of patients is higher these days in the OPDs," the Doctor said. The World Health Organization (WHO) recently classified JN.1 as a variant of interest, distinct from its parent lineage BA.2.86. However, the global health body emphasised that the overall risk posed by JN.1 remains low based on current evidence. (ANI)[29]

WHO Classifies JN.1 Coronavirus Strain As 'Variant of Interest'

Fig. no-11

The World Health Organisation (WHO) on Tuesday classified the JN.1 coronavirus strain as a "variant of interest", but said it did not pose much threat to public health. "Based on the available evidence, the additional global public health risk posed by JN.1 is currently evaluated as low," WHO said. JN.1 was previously classified as a variant of interest as a part of its parent lineage BA.2.86. The United Nations agency said current vaccines continue to protect against severe disease and death from JN.1 and other circulating variants of the Covid-19 virus. According to G C Khilnani, Chairman of PSRI Institute of Pulmonary, Critical Care and Sleep Medicine, the new variant (JN1) was first identified as Luxembourg and is a descendant of the Pirola variant (BA.2.86), which itself stems from the Omicron sub-variant. It carries mutations which enhance its capability of Immune escaping capabilities which is also reported by the CDC, Atlanta, USA. In the USA, at present 15-29 per cent of cases of Covid are caused by this variant. "Fortunately, the disease is mild causing fever, sore throat, cough, body aches etc. The first cases in India were reported from Kerala in elderly women with mild symptoms. Historically, the first case of Covid was also detected in Kerala at the beginning of the Pandemic," Khilnani said. "This elegant research study published on 15 December in the journal Lancet has illustrated the biotechnological basis by which the JN.1 virus evades (escapes) pre-existing immunity. However, in my thinking, there is no need for any kind of panic. Corona, an RNA virus, is notorious for mutations and with enhanced facilities of detection and characterisation, more and more variants are periodically detected. This particular variant (JN1) is fortunately causing mild illness," he said. However, as a matter of extreme caution, it is advised that 'Covid appropriate behaviour' should be practised, especially by the susceptible population of which hand hygiene (and mask by susceptible population) is most important. Creating panic, at present may confuse, as there is a high incidence of cough, sore throat and other viral-like illnesses in Delhi NCR attributable to air pollution, Khilnani added. he also said that susceptible populations with influenza-like illnesses (fever, body ache sore throat, running nose, cough) may be tested for Covid with RTPCR or home testing by a Kit. For susceptible populations, it is best to avoid going too crowded. With high levels of air pollution, it is best to use an N95 mask which will protect against both Covid and the adverse effects of pollution[30].

Should I take a COVID-19 test to find out if I have JN.1, BA.2.86 or another subvariantsubvariant?

While a COVID-19 test will not tell you which variant of SARS-CoV-2 caused your infection, it is important to get tested if you have been exposed or are experiencing symptoms. The COVID-19 testing will tell you whether you have or have had a recent infection. Nucleic acid amplification tests and antigen tests can both be used. But at-home tests are also available for rapid results. If an at-home test is positive, isolate and speak with your physician for further guidance. Testing can also differentiate between COVID-19, the cold, flu and RSV as well as help discern what treatments to follow[31].

JN.1 is much more immune evasive than its ancestral strains

JN.1 variant is spreading at a faster pace. Calling it "quite devious", Thomas Russo, M.D., professor and chief of infectious diseases at the University at Buffalo in New York told Prevention.com that JN.1 also has a mutation on its spike protein that seems to make it much more immune evasive than its parents. “There’s some inferential data from lab findings that JN.1 may be more infectious,” he said.

How to stay safe?

To stay safe during COVID, practice regular hand hygiene by washing hands with soap and water. Wear masks in crowded places, aintain physical distance, and adhere to local guidelines. Avoid touching your face, especially eyes, nose, and mouth. Stay informed about the latest developments, follow vaccination recommendations, and seek medical advice if symptomatic. Disinfect frequently touched surfaces, and prioritize outdoor activities when possible. Practice good respiratory hygiene by covering your mouth and nose when coughing or sneezing. Stay home when feeling unwell, and encourage others to do the same. Adopt a proactive and cautious approach, considering the evolving nature of the pandemic[32].

JN.1 Covid variant 'more transmissible, more infectious': Ex-ICMR expert warns of more cases in India.

India has recorded a total of 4,097 active Covid-19 cases, according to Union Health Ministry data. As per official data, six deaths have been reported in the country in the last 24 hours - two in Maharashtra, and one each in Delhi, Karnataka, Kerala, and West Bengal. Dr Soumya Swaminathan, Former DG, Indian Council of Medical Research (ICMR) has warned that the JN.1 Covid-19 variant is more transmissible, and infectious, as compared to other variants. The health expert cited “certain mutations" for the JN. 1 Covid-19 variant's transmissibility. Swaminathan said that the JN.1 Covid-19 variant belongs to the Omicron family, the same variant that drove the third Covid wave in India[33].

CONCLUSION:

To conclude the review of the JN 1 variant, it's important to emphasize the potential impacts on transmission, severity, and effectiveness of current countermeasures. Additionally, highlighting the importance of continued surveillance, research, and adaptation of public health strategies in response to emerging variants is crucial in mitigating their potential impact on global health. Another important aspect to consider in the review of the J.N variant is its potential to evade immunity conferred by previous infections or vaccinations. Understanding whether this variant poses a significant threat to existing immunity levels can inform vaccination strategies and public health measures aimed at controlling its spread. Additionally, assessing the variant's impact on diagnostic testing accuracy and treatment efficacy is essential for healthcare jsystems to effectively manage cases and prevent further transmission.

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