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Review Article

Vigilance, Not Panic: Understanding the Emerging COVID-19 Variant NB.1.8.1

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Abstract

The emergence of the NB.1.8.1 variant of COVID-19 in India marks another critical juncture in the ongoing trajectory of the pandemic. A progeny of the Omicron BA.2.86 lineage, NB.1.8.1 harbours multiple mutations in the spike protein, particularly in the Receptor-Binding Domain (RBD), like F486P, E484K, N501Y, which raise concerns about increased infectivity and potential immune escape. Although it has not been designated a Variant of Concern by the World Health Organisation (WHO), its genetic profile warrants close monitoring. Clinically, the variant primarily presents with mild upper respiratory and systemic symptoms; however, high-risk individuals remain vulnerable to complications. Current diagnostic modalities, including RT-PCR and antigen-based assays, remain effective, while genomic surveillance is essential for accurate variant detection. Early reports suggest no increase in severity; however, high transmissibility of the NB.1.8.1 variant could still place significant strain on healthcare systems. Vaccination continues to provide strong protection against severe illness, though booster uptake remains suboptimal, particularly among the elderly and immunocompromised patients. While reinfection is possible, hybrid immunity and T-cell-mediated response offer a degree of protection. As NB.1.8.1 spreads, India must respond with scientific vigilance rather than complacency by strengthening surveillance, updating vaccines, reinforcing public health measures, and maintaining community awareness. Adaptive, evidence-based strategies are urgently required to address the dynamic mutational landscape of the SARS-CoV-2 virus.

Keywords: COVID-19; Coronavirus 2; NB.1.8.1 COVID-19 variants; Severe acute respiratory syndrome; SARS-CoV-2

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Introduction

The recent detection of the SARS-CoV-2 variants NB.1.8.1 and LF.7 in India has led to public concern, especially as cases rise across parts of Southeast Asia. However, it is important to assess this development with evidence-based reasoning. As the pandemic evolves, the appearance of new viral lineages demands attention due to their chances of transmission, severity of infection, vaccine effectiveness, and the burden of long-term complications following infection [1-3].

A study from the Indian SARS-CoV-2 Genomics Consortium (INSACOG), NB.1.8.1 was detected in Tamil Nadu in April 2025, while four cases of LF.7 were identified in Gujarat in May. Both are subvariants of Omicron, likely deriving from the currently dominant JN.1 lineage. Recent reports indicate that JN.1 comprises over half (53%) of sequenced SARS-CoV-2 samples in India, followed by BA.2-related variants (26%) and other Omicron sublineages (20%) [4].

As of May 23, 2025, the WHO has categorised NB.1.8.1 and LF.7 as Variants Under Monitoring (VUM), suggesting it may possess notable genetic changes but do not yet demonstrate a clear epidemiological impact [5]. Early data from the WHO suggests that NB.1.8.1 poses a low to intermediate public health risk. While it carries spike mutations (A435S, V445H, T478I) which might be associated with increased transmission and immune evasion, current evidence does not indicate greater severity compared to previous variants [6].

Several states have reported recent increases in COVID-19 cases. For instance, in May 2025, Delhi reported 23 new cases, Andhra Pradesh four, and Telangana one. Bengaluru registered a positive case in a nine-month-old child. Kerala reported 273 new infections during the same month [7,8]. Despite these numbers, most infections appear mild. Clinicians such as Dr. Aviral Mathur and Dr. Dhruv Chauhan have stated that the dominant strain, JN.1, is generally associated with mild symptoms and does not warrant panic, though adherence to standard hygiene practices remains advisable [9,10].

In the United States, NB.1.8 has also been identified. Experts from the CDC and FDA, including Drs. Natalie Thornburg and Jerry Weir, have noted that SARS-CoV-2 now appears to exhibit seasonal fluctuations, with new dominant variants often emerging from existing lineages [11-13].

Genetic Features and Evolutionary Context of NB.1.8.1

NB.1.8.1 is a sublineage of Omicron BA.2.86 and contains several spike protein mutations. Of particular note are changes in the RBD that influence interaction with the ACE2 receptor and neutralising antibodies [14,15]. Notable mutations include F486P, E484K, and N501Y were previously linked to increased binding affinity and immune evasion in earlier variants [16].

The emergence of NB.1.8.1 is part of a broader trend observed with other Omicron sublineages, such as LB.1 (also called the "FLiRT" variant), which saw a spike in emergency department visits

in early 2024 [17]. NB.1.8.1 evolved from XDV 1.5.1 and features additional spike protein mutations compared to LP 8.1 and JN.1 [18]. Preliminary studies from China suggest NB.1.8.1 exhibits enhanced binding affinity to cells, which may contribute to its higher transmissibility [19].

Although not classified as a Variant of Concern (VOC), the variant's ability to partially escape immunity, particularly in those with older vaccine-induced protection, is a matter for ongoing study. Enhanced genomic surveillance remains critical [4].

Clinical Presentation

Current reports suggest that symptoms of NB.1.8.1 largely resemble previous Omicron infections, with mild respiratory complaints like sore throat, nasal congestion, mild fever, fatigue, and occasional gastrointestinal issues such as nausea or mild diarrhoea [20-25]. Loss of smell and taste has become less common. These symptoms have been predominantly mild, especially in individuals with prior infections or vaccination [26-29].

No significant increase in hospitalisations or mortality has been attributed to NB.1.8.1 or LF.7. Nevertheless, older adults, those with chronic conditions, and immunocompromised individuals remain vulnerable. The variant's potential to escape immune responses may reduce the effectiveness of older vaccine-induced immunity [30,31].

Disease Severity and Hospital Trends

At present, NB.1.8.1 does not appear to cause serious disease like earlier Omicron strains. Hospitalisation rates remain low. However, widespread transmission could increase total case numbers, indirectly leading to more hospital admissions. Coinciding respiratory infections and low booster coverage may further strain healthcare systems [2,32-35].

India's public health infrastructure, including the Integrated Disease Surveillance Programme (IDSP) and the Indian Council of Medical Research (ICMR), has maintained active monitoring. The Directorate General of Health Services has reported no need for hospitalisation in most current cases [36,37]. States like Delhi have issued advisories to ensure hospital readiness and emphasised continued testing, isolation, and genome sequencing [38].

Diagnostics

RT-PCR remains the most reliable test for COVID-19 diagnosis. Most commercial assays can detect NB.1.8.1 as it does not exhibit deletions in commonly targeted genomic regions. While rapid antigen tests are still in use, their sensitivity is variable. Broader sequencing, especially in clinical clusters and among international travellers, is necessary for tracking variant spread [39,40].

Public Health Recommendations

Fundamental prevention measures continue to be relevant: mask-wearing in closed or crowded spaces, regular hand hygiene, and isolating when symptomatic. States are advised to maintain screening and isolation protocols, particularly in institutions and transport hubs [41-47].

Population Immunity and Reinfection Risks

India's population exhibits variable immunity. Some individuals have hybrid immunity (infection plus vaccination), while others may have waning protection due to time since last dose or infection [48-51]. Reinfections are expected, particularly among those previously infected with pre-Omicron strains. T-cell-mediated immunity remains relatively preserved, even as antibody levels decline [52-55].

While memory B-cell responses to Omicron have diminished, T-cell responses across CD4+ and CD8+ subsets remain robust. This may protect against severe outcomes despite reduced neutralising antibody levels [54-57].

Vaccine Effectiveness

India has achieved high coverage for primary and first booster doses, but uptake of the second booster, particularly among the elderly, is lower [58,59]. Studies indicate that vaccines such as Covishield and Covaxin continue to protect against severe illness, though their ability to prevent infection is reduced due to ongoing mutations [60-62]. Updated mRNA vaccines and nasal formulations tailored to Omicron sublineages may offer additional benefits [63-65]. Adaptive policy responses, including flexible booster schedules and improved surveillance, should be prioritised [66,67]. Vaccination has played a critical role in decreasing the hospital stay and long COVID [68-70].

The NB.1.8.1 variant is another reminder that SARS-CoV-2 continues to evolve. Although current data does not suggest a significant public health threat, continuous monitoring is essential [71]. Strengthened genomic surveillance, updated vaccines, and renewed emphasis on preventive measures will be key to managing its spread. While no immediate cause for alarm exists, appropriate preparedness grounded in scientific evidence remains essential for mitigating the impact of future surges.

Conclusion

As India reports fresh cases of the new COVID-19 variant NB.1.8.1, the public health narrative again finds itself at a familiar crossroads by balancing vigilance with preparedness. This variant, marked by mutations that may enhance immune escape and mimic symptoms of earlier strains, explains the ongoing mutation of this virus under immune and environmental pressures. While the threat level remains moderate, complacency could prove detrimental.

A science-driven, proactive approach is essential. Strengthening genomic surveillance linked to clinical outcomes, reinstating masking and testing in high-risk areas, and expediting booster vaccinations, especially for vulnerable groups, is critical. Rapid approval and deployment of updated vaccines targeting new variants must be prioritised. Simultaneously, consistent public health messaging and community adherence to COVID-appropriate behaviour remain key. This evolving situation calls not for panic but for preparedness, guided by scientific vigilance and coordinated action across healthcare, policy, and public domains.

Data Availability Statement

We declare if data is being shared, we shall provide the data.

Conflict of Interest Statement

No conflict of interest declared.

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Ethical Statement by all Authors

1. This material is the authors' original work, which has not been previously published elsewhere.
2. The paper is not currently being considered for publication elsewhere.
3. The paper reflects the authors' research and analysis truthfully and completely.
4. The paper properly credits the meaningful contributions of co-authors and co-researchers.
5. The results are appropriately placed in the context of prior and existing research.
6. All sources used are properly disclosed (correct citation). Copying of text must be indicated as such by using quotation marks and giving proper reference.

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