

## INTRODUCTION TO THE DEVELOPMENT, SPREAD AND VACCINATION OF COVID-19 IN INDIA

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### ABSTRACT

Covid 19 is a viral disease spread in the 2019 era .It was a global pandemic. It was named as shortly from 'corona virus discovered in 2019'. The article would give a brief idea about the pandemic, how is it controlled and managed in India, it's case fatality rate, mortality rate, vaccination of Covid-19 in India. The article was written as a part of assignment, there are several arguments regarding the application of certain medications and methods used in below. Several data's are susceptible for change as the disease is still there and there are possibility of even a new outbreak.

**KEYWORDS:** COVID 19, coronavirus, India, 2DG, covid new cases.

### 1. INTRODUCTION

The corona virus is from the order of Nido virudae from the family corona viridae with the subfamily ortho corona viridae. The virus is equipped with 4 genes ie alpha corona virus, beta corona virus, gamma corona virus and the delta corona virus.

Alpha corona virus contains 2 strains of 229E, NL63.

Beta corona virus having HK u1, OC43; SARS, SARS Cov2 Which would be under the subaco virus and gamma corona, MERS -marbocovirus and gamma and delta corona viruses are in birds.

Cultivation- the cultivation of corona virus is so difficult that it is cultivated in human tracheal ring organ culture. NL-63, OC43, 229E, HK U1. Vero 6 - is the standard using in viral stock cells.

SARS COV was in the year 2002 in gyangdon China, the spillover host was civet cats and raccoon dogs the virus entry was through ACE 2 receptors.

Car- 7-17%.it was completely suppressed by July 2003 with 8098 cases and 774 death.

MERS -2012 -spillover host from camels seen first on UAE, the receptor of entry was CD26- dipeptigyle peptidase 4, MERS was having a car of 28-35%.

The SARS COV 2 this is the so called covid-19 with a 30 Kbp and a positive sense RNA genome SARS COV 2 is having a 79% homology to SARS COV and a 50%

homology to MERS. Encodes 4 structural proteins Several (>20) non structural protein.

### 2. Virology

4 structural protein

- **Spike (s) protein**

1. virus entry
2. TARGET for neutralizing

- **Nucleic capsid (n) phosphoprotein**  
Which encloses RNA genome

- **Envelop (e) protein**
- **Matrix (m) protein**

### 3. Pathogenesis

The pathogeneses of the sars COV 2 is by using its spike s protein to the ace 2 receptors and further the TMPRS S2 is Responsible for Lysis if s1 viral protein which fuses and further endocytosed into the cell.

It can also enter through the. CD147 / basigin receptor which is also a receptor for P. Falciparum.

The cov2 is a discontinuous transcription ie the 5' -3' strand containing ORF 1A and ORF 1B transcribed and make poly protein 1A and poly protein 1B,

This will develop a protease RDRP which sense -ve RNA to +ve RNA and make further viral protein inside

the cell ribosome. This is assembled and new virus is endocytosed.

RDRP is well known for its error proofing so a wide variety of cov2 but thankfully the virus contain 3'-5' exonucleases which proof read the created RNA genome.

The current strain around the globe is D614G Strain.

### 3.1 Diagnosis of covid-19

NAAT

Antigen detection

Antibody detection in serum

Incubation period - 2-14 days

5-6 days NAAT and Antigen detection can be done.

IgM antibody is seen in the end of 1st week and IgG antibody seen after the 2nd week and further.

Specimen is taken from upper respiratory tract, lower respiratory tract, saliva, stool, whole blood. Nasopharyngeal swab and oropharyngeal swab is mainly taken in INDIA and who proposes Nasal mid turbinate swab and anterior nares swab. Nasopharyngeal wash/aspirate saliva specimen can be taken. It is recommended not to use cotton swab, calcium alginate swab, dacron, rayon, polyester, flexible wire, plastic can be taken.

### 3.2 Transport medium

1. hanks balanced salts solution with calcium, magnesium with heat inactivated feral bovine serum + gentamicin + amphotericin B.
2. STERILE salts
3. Pig saline
4. Anic's medium

Reverse transcriptase PCR is taken for COVID 19, It screens for S,N,E, M viral protein and can be confirmed by getting RDRP gene produced from ORF 1A and ORF 1B.

1. qRT-PCR
2. Taq Man probes
3. True NAT - it's a qualitative test for taking E gene
4. CBNAAT
5. FELUDA

Antigen detection test

Antibody detection test

1. Elisa
2. CLIA

### 4. Covid-19- in India

Coronavirus cases in India

-44,675,509

Deaths : 530,653

Recovered: 44,139,558

## Total Coronavirus Cases in India

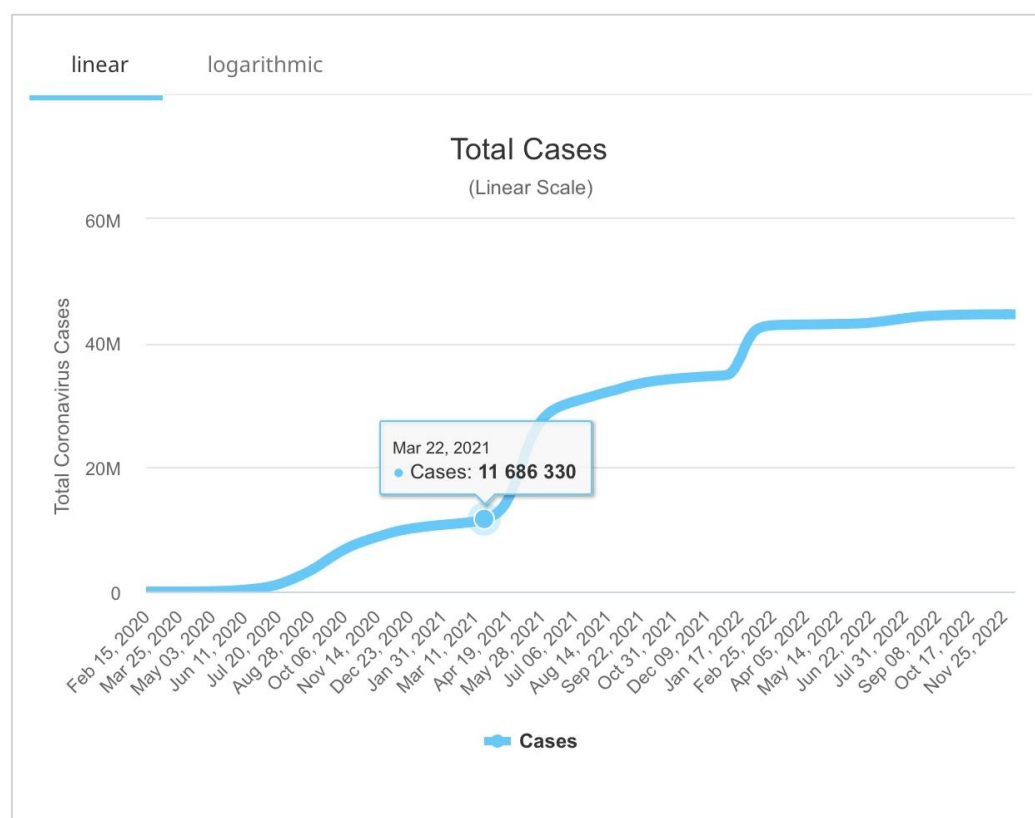


Figure 4.1.

COVID-19 STATEWISE STATUS <span>⊖</span>							
As on : 09 Dec 2022, 08:00 IST (GMT+5:30) (Last updated : 9/12/2022, 4:31:40 PM)				Search: <input type="text" value="Search by State/UTs"/>			
State/UTs ⬇	Total Cases ⬆	Active ⬇	Discharged ⬆	Deaths ⬇	Active Ratio ⬇	Discharge Ratio ⬇	Death Ratio ⬇
Andaman and Nicobar	10,741	0	10,612	129	0%	98.80%	1.20%
Lakshadweep	11,415	0	11,363	52	0%	99.54%	0.46%
Dadra and Nagar Haveli and Daman and Diu	11,591	0	11,587	4	0%	99.97%	0.03%
Ladakh	29,406	0	29,175	231	0%	99.21%	0.79%
Nagaland	35,986	0	35,204	782	0%	97.83%	2.17%
Sikkim	44,317	1 ⬆ 1	43,817 ⬆ 1	499	0.00%	98.87%	1.13%
Arunachal Pradesh	66,889	0	66,593	296	0%	99.56%	0.44%
Meghalaya	96,779	2	95,153	1,624	0.00%	98.32%	1.68%
Chandigarh	99,340 ⬆ 1	3 ⬆ 1	98,156	1,181	0.00%	98.81%	1.19%
Tripura	1,08,033	0	1,07,093	940	0%	99.13%	0.87%
Manipur	1,39,920 ⬆ 1	2 ⬆ 1	1,37,769	2,149	0.00%	98.46%	1.54%
Puducherry	1,75,491	4	1,73,512	1,975	0.00%	98.87%	1.13%
Mizoram	2,38,962	7 ⬆ 2	2,38,229 ⬆ 2	726	0.00%	99.69%	0.30%
Goa	2,59,045 ⬆ 4	18 ⬆ 2	2,55,014 ⬆ 2	4,013	0.01%	98.44%	1.55%
Himachal Pradesh	3,12,589 ⬆ 1	16 ⬆ 1	3,08,360 ⬆ 2	4,213	0.01%	98.65%	1.35%
Jharkhand	4,42,567	0	4,37,236	5,331	0%	98.80%	1.20%
Uttarakhand	4,49,328 ⬆ 30	53 ⬆ 29	4,41,524 ⬆ 1	7,751	0.01%	98.26%	1.73%
Jammu and Kashmir	4,79,377 ⬆ 1	12 ⬆ 2	4,74,580 ⬆ 3	4,785	0.00%	99.00%	1.00%
Assam	7,46,099	0	7,38,064	8,035	0%	98.92%	1.08%
Punjab	7,84,146	22	7,64,835	19,289	0.00%	97.54%	2.46%
Telangana	8,41,166 ⬆ 9	61 ⬆ 7	8,36,994 ⬆ 16	4,111	0.01%	99.50%	0.49%
Bihar	8,51,356 ⬆ 2	5	8,39,049 ⬆ 2	12,302	0.00%	98.55%	1.44%
Madhya Pradesh	10,54,909 ⬆ 1	8	10,44,125 ⬆ 1	10,776	0.00%	98.98%	1.02%
Haryana	10,56,547 ⬆ 3	45 ⬆ 2	10,45,788 ⬆ 1	10,714	0.00%	98.98%	1.01%
Chhattisgarh	11,77,737 ⬆ 1	5	11,63,586 ⬆ 1	14,146	0.00%	98.80%	1.20%
Gujarat	12,77,486 ⬆ 5	186 ⬆ 2	12,66,257 ⬆ 3	11,043	0.01%	99.12%	0.86%
Rajasthan	13,15,294 ⬆ 5	60 ⬆ 3	13,05,581 ⬆ 8	9,653	0.00%	99.26%	0.73%
Odisha	13,36,481 ⬆ 4	88 ⬆ 1	13,27,188 ⬆ 3	9,205	0.01%	99.30%	0.69%
Delhi	20,07,020 ⬆ 5	21 ⬆ 9	19,80,480 ⬆ 14	26,519	0.00%	98.68%	1.32%
West Bengal	21,18,512 ⬆ 4	48 ⬆ 1	20,96,933 ⬆ 5	21,531	0.00%	98.98%	1.02%
Uttar Pradesh	21,28,052 ⬆ 5	105 ⬆ 2	21,04,314 ⬆ 3	23,633	0.00%	98.88%	1.11%
Andhra Pradesh	23,39,060 ⬆ 1	7	23,24,320 ⬆ 1	14,733	0.00%	99.37%	0.63%
Tamil Nadu	35,94,239 ⬆ 9	84 ⬆ 8	35,56,106 ⬆ 17	38,049	0.00%	98.94%	1.06%
Karnataka	40,71,493 ⬆ 23	1,626 ⬆ 3	40,29,561 ⬆ 26	40,306	0.04%	98.97%	0.99%
Kerala	68,26,959 ⬆ 93	1,486 ⬆ 15	67,53,953 ⬆ 102	71,520 ⬆ 6	0.02%	98.93%	1.05%
Maharashtra	81,36,107 ⬆ 41	253 ⬆ 4	79,87,447 ⬆ 45	1,48,407	0.00%	98.17%	1.82%

Figure 4.2.

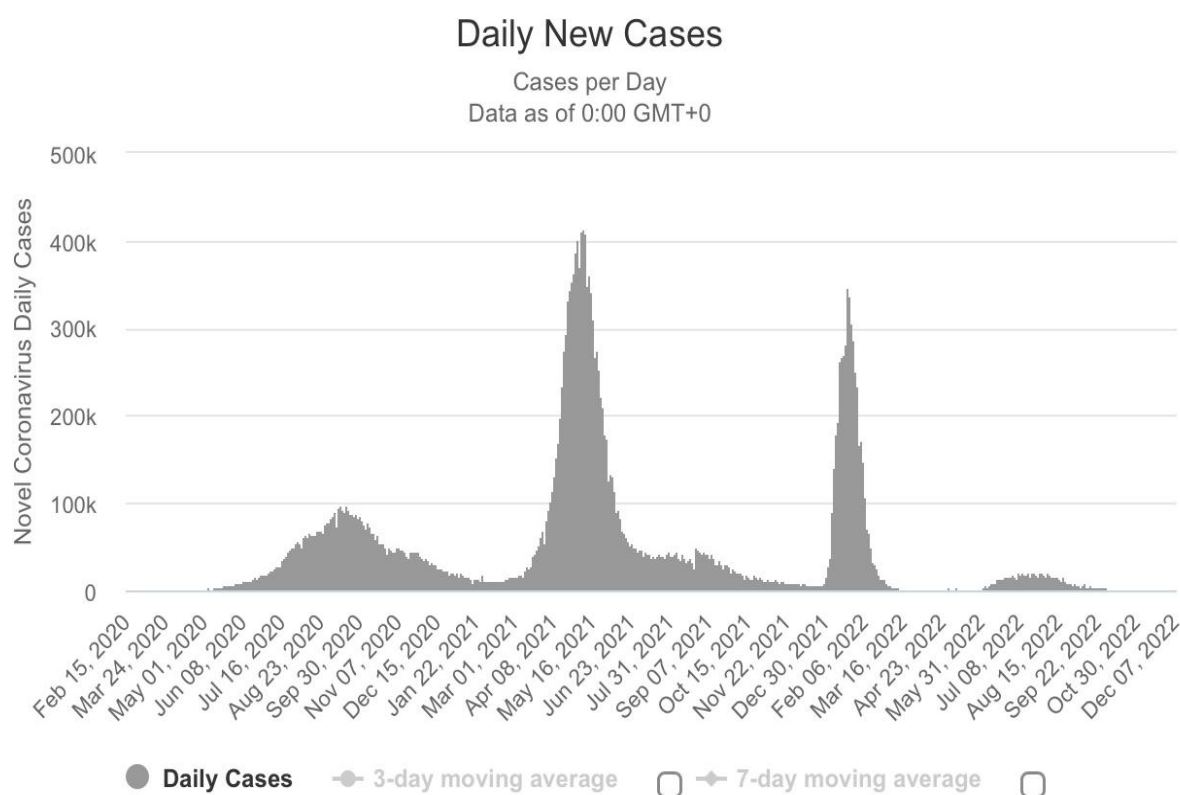
The first case of Covid-19 in India was reported on January 30, 2020 in Kerala. 3 Indian students returned from Wuhan and also a family returned from Italy was also alleged on the spread of the virus. At that time K.K Shailaja was the health minister of Kerala. She managed very well in controlling the pandemic for a while and was appreciated for those new introduced methods around the globe. Lockdown was announced in Kerala on 23 March and in the rest of the country on 25th March. Route maps of the above mentioned individuals were taken and they were quarantined. The suspected individuals of those close contacts, all those coming from abroad were tracked and been advised to self quarantine. Aarogya, a website that had become mandatory for all traversing to India to register and there by providing the details to the health department for further tracking. All passengers were taken rapid antibody test and those with +ve results were taken to

Gov. Covid treatment centres and was treated for free. And -ve results travellers were advised to keep a home quarantine for 14 days even though they were asymptomatic.

Infectious rate started to drop by September. With the new methods.

As people realised the disease is being controlled, they began to bother less on the pandemic and not taken restrictions seriously and continued to live normal life, as a result the pandemic spiked. A second wave had begun in March 2021, it had become devastating, the shortage of beds, ventilators, oxygen cylinders and other medical supplies worsens. Even though Kerala faced shortages it was prepared for the needs and was appreciated around the globe for its vision and infrastructure. But around India the situation was worsening.

## Daily New Cases in India



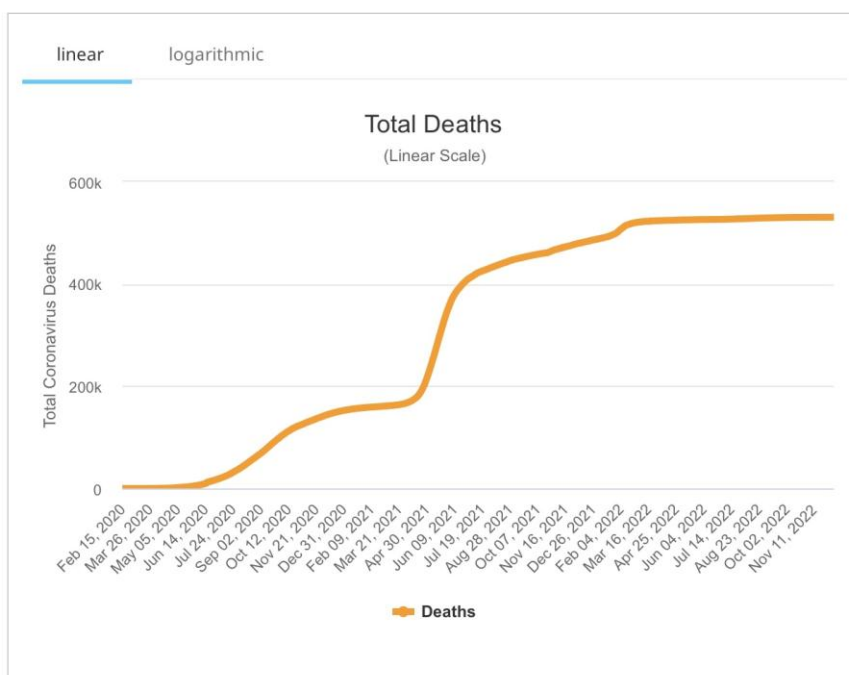
**Figure 4.3.**

Around March - September 2021 the pandemic spiked infecting around 400 k individuals. The daily new cases can be seen from the above chart.

The death cases also increased a lot, that all old age patients and those who were having broncho pulmonary problems are at worse conditions. Ventilators were not

enough to support their life, the cytokine storm which was an immune response worsens the condition, most death was due to acute respiratory distress syndrome (ARDS). The daily death can be accessed from the given chart below.

## Total Coronavirus Deaths in India



**Figure 4.4.**

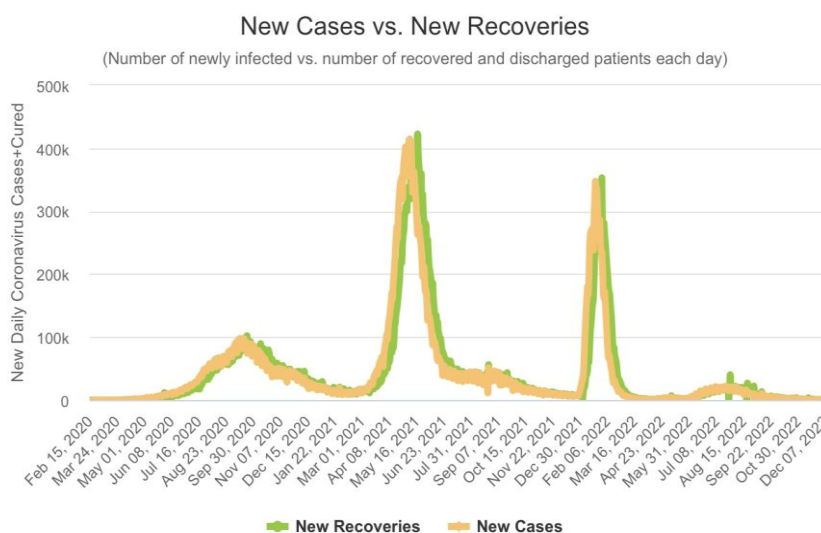
Soon India began its vaccination program and was successful in developing its own vaccines COVISHIELD and COVAXIN. Those were approved for emergency use too. On January 30, 2022, INDIA announced that it administered about 1.7 billion doses to more than 720 million people.

It had also developed medications. The anti-covid drug which is referred to as '2DG' (2-deoxy-D-glucose) has been developed by the DRDO laboratory Institute of

Nuclear medicine and allied Science in collaboration with Dr Reddy's laboratory, the medication hailed as an innovative holy grail for covid patients in India.

The recovery was also soon, the development of vaccine and its successful administration boosted the treatment and developed resistance to the disease to prevent a cytokine storm which was the exaggerated immune response of the body.

## Newly Infected vs. Newly Recovered in India



**Figure 4.5.**

The recovery of patients after the vaccine and the new medications had helped that recovery and new cases came into same level according to the statistics.

Now the disease is maintained under control. All the quarantine and the need to wear mask when going outside, and all the fines related with the pandemic restrictions were removed, life in India is coming back to normal with mild cases here and there. We can say that India successfully suppressed the pandemic. Given below the whole outcome of cases in India.

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