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COVID 19: A RESPONSE FROM SOUTH INDIA

Today, the world has come to a standstill because of a virus that has now become the greatest threat to global health. Coronavirus disease 2019 (COVID-19), caused by Corona virus, belongs to the family of RNA viruses that cause diseases in mammals and birds. They are positive, single stranded and enveloped viruses, which infect humans and a wide range of animals. These viruses cause respiratory tract infections in humans that can range from mild to fatal. Mild illnesses include the common cold (which is often caused by other viruses, mostly rhinoviruses), while more lethal strains that has infected humans are SARS, MERS, and COVID-19. Other species' symptoms differ - in poultry, they cause upper respiratory tract disease, while in cows and pigs, they cause diarrhoea.

This outbreak of the novel coronavirus SARSCoV2 (coronavirus disease 2019; previously 2019nCoV) that has now spread globally, started in Hubei Province of the People's Republic of China. The WHO Emergency Committee declared a global health emergency on January 30, 2020 [1]. Tyrell and Bynoe cultivated corona viruses from patients with common cold in 1966. They were termed corona virus after observing the morphology as spherical virions with a core shell and projections resembling a solar corona. [2]

First Covid 19 case in India was reported in Kerala on 30th January, 2020, in a student who returned to Kerala from Wuhan city on Jan 23rd owing to the start of pandemic. Her travel included train trip from Wuhan to Kunming where she was exposed to other passengers with symptoms of respiratory illness. [3] Kerala with a long history of organized health care and excellent health indicators, managed to introduce a steady rise in number of institutions and hospital beds for allopathic treatment. The state also offered treatment in medical institutions under indigenous system of medicine such as Ayurveda. Kerala has well-established health infrastructure and an efficient surveillance system with advanced facilities to identify communicable diseases. The state's prior experience with Nipah virus outbreak in March 2018 had prepared the public health professionals in handling covid. The systematic detection and tracking of confirmed cases along with monitoring of health status were performed on regular basis, and infected patients were isolated. The effort of the health department helped control the spread after the reported death of 17 people.

Kerala's Public Health Delivery System had successfully handled previous emergencies caused by the outbreak Dengue, Chikungunya, Leptospirosis, Malaria, Hepatitis, and H1N1 among others. Kerala definitely has well established mitigative plans to execute during this pandemic which the government has already made into practice during the spread of local communicable diseases. [4]

Karnataka, a south Indian state neighbouring Kerala, reported its first case of Covid 19

infection on March 8, 2020, more than a month after the first case was reported in Kerala. [5] The state has 31 districts with a population of 6, 10, and 95,297. [6]

Karnataka government soon imposed a ban on international passenger travel. There are two major international airports in Karnataka (Bangalore and Mangalore). Studies clearly indicate that the tracing and containing of cases were very effective in the whole state. It was followed by a nationwide closure of air and rail routes. However, this was not as effective in preventing an ever-increasing number of cases resulting from domestic travel. Even though nationwide lockdown was imposed cases continued to increase in Karnataka. [5]

Karnataka reported fewer cases than other Indian states in the initial phases of the infection's spread through the country and was among the earliest states to deploy modern technology tools as part of its logistics and containment measures.

Bangalore, a densely populated metropolitan city, is the capital city of Karnataka. It has one-sixth of Karnataka's population in 1% of its area. Bangalore airport is a major transit point for domestic and international travellers. These factors may explain Bangalore's relatively heavy burden of COVID-19 cases. Immediately after the World Health Organization confirmed the novel coronavirus as the cause of the outbreak in China, precautionary screening and quarantine of passengers arriving from areas of concern at Bangalore International Airport were started by Public Health Authorities. These early steps are the reason why there were no major clusters originating from international travellers. On the other hand, several clusters were formed by people with a history of travel to Delhi, the national capital. Studies revealed

that most cases of COVID-19 in Karnataka were among the young and middle-aged men. Deaths, however, occurred overwhelmingly among elderly patients. [7]

Local governments in Kerala, which are actively engaged in public health, played an important role in managing the disease and mitigating its effects on the vulnerable. Transparency of information and the government's ability to trust the people have also led to an increase in trust of the government. These strengths have served Kerala well in dealing with the next wave of COVID-19 infections. [5] The people of Kerala understood their vulnerability and the seriousness of the outbreak. Majority trusted and followed the authorities' recommendation and were positive about various government policies. The government thereby gained community's confidence, and appropriate healthy behaviour was observed in the early stages of the pandemic situation. [6]

In Karnataka, the government-initiated measures to control the spread of COVID-19 in early February 2020. A task force appointed by the government formulated guidelines for quarantine and contact tracing. Field workers were trained to obtain travel and contact history, and they carried out telephonic and house-to-house surveys to identify primary and secondary contacts of positive cases. Data collected at the community level was combined by the State. Daily bulletins, containing anonymized patient and contact data, were uploaded to the portal by the government. The portal was created to share information on COVID-19.

The Karnataka government implemented a phased lockdown to contain the outbreak in the state. Shops and offices were closed, and interdistrict and interstate travel was shutdown. Phase 1 of the lockdown, with the most

stringent restriction on travel and socialization, was from 24 March to 14 April. The second phase was from 15 April to 3 May, and the third phase was from 4 May to 17 May. [7]

The situation was very different when the overall national scenario was considered where Hospitals were overburdened, and health workers were tired and getting infected. Social media was flooded with desperate people (both doctors and the general public) looking for medical oxygen, hospital beds, and other necessities. Ignoring the result of serosurvey by the Indian Council of Medical Research in January, which suggested that only 21% of the population with antibodies against SARS-CoV-2, government response was found to be underprepared.

Despite warnings about the dangers of super spreader events, the government permitted religious festivals and political rallies to take place attracting millions of people that were notable for their lack of COVID-19 preventive measures. India's COVID-19 vaccination programme had vaccinated less than 2% of the population. India's vaccination plan quickly unraveled at the federal level. The government changed its course without consulting with states, extending vaccination to all, over the age of 18, depleting stocks, and causing public uncertainty as well as an irrational pricing policy that resulted with various healthcare sectors competing for vaccine procurement. [7] The largest single-day spike in Kerala so far has been recorded on May 6, 2021, with 42,464 new cases. There are a total of 19, 30,115 confirmed cases in the state, with 4, and 19,726 active cases. Currently, the test positivity rate is 27.56 percent. [8]

Kerala's performance in containing COVID-19 was lauded nationally and internationally. Kerala had reduced the incidence of new cases to less than 0.25 percent per day by 30 April 2020, after a large number of cases were registered in March. Following the return of Keralites from other countries and Indian states in mid-May, there was a rise or "second wave" of new cases. A major cluster of cases was discovered in Thiruvananthapuram's Kumarichantha fish market in July. Following Onam (a religious festival observed in this state), there was a surge in cases, with a large number of new cases registered in late October in the districts of Malappuram, Kozhikode, Ernakulam, and Thrissur. Active cases peaked at 97,525, then began to decline before bouncing back to over 4,00,000 in May 2021. In comparison to the national average of 1.09 percent, the state has the lowest case fatality rate in India, at 0.32 percent. [9]

The much spoken Kerala model of containment received international recognition. The state gave utmost importance to social sector development and focused on health and education as the two primary areas of development. Primary health care and education were given paramount importance not diminishing the involvement of private sectors in the advanced health or education sector. The priority of all the successive Kerala governments was universal literacy. Kerala went forth to become the most literate state in India with a 96.2% literacy rate, which gave it a strong human resource base. Numerous measures were taken by the state to upgrade the primary health centers to meet the medical requirements of the citizens.

A program named 'Aardram mission' was launched by the government who came into power in 2016, with the objective of transforming the Public Health Centres and increasing the percentage of population using government hospitals. It aimed at creating 'people friendly' health delivery system in the state. Under the mission, more than 5,289 posts

of hospital workers were added. Moreover, investment doubled from 6290 million in 2014–15 to 14190 million in 2018–19 through budgetary resources.

The state gave supreme importance to the public health sector and has an uncompromising attitude toward hygiene and health of every single individual, which paved the way for state to handle this covid challenge. The state could easily communicate to the general public about the precautions to be taken to flatten the curve, as it had an educated population. The state was as transparent as it can get in dealing with the deadly virus. The Chief Minister has been holding a live press conference every day. Daily News Bulletin is published by Directorate of Health Services, Kerala, regarding the virus spread, number of cases, covid deaths and the necessary precautions taken by the government to prevent it and the necessity for the alertness required from citizens. [10]

Kerala Government initiated 'awareness drives' all around the state (covering all districts) among - migrant employees, guests from different states, and native folks. Government also conducted campaigns against the spread of fake news and were strictly on the side of science and reason. Those who created fake medical claims on social media concerning Covid-19 were keenly aware of strict government actions taken by Police against those who spread fake news. Social employees in Kerala helped in spreading awareness regarding Covid-19 and were involved in providing necessities such as masks, sanitizers and clothes for people. On 4 March 2020, a BBC broadcast on COVID-19 had praised Kerala for its timely, effective and economical handling of the cases within the state.

All those who came from countries like China and Italy were isolated by the health department even though they showed minor symptoms. Global Health Organization reported that COVID-19 patients show the symptoms like fever, tiredness, dry cough in some patients, symptoms like aches and pains, inflammatory disease, looseness of the bowels, nasal congestion or running nose may persist. They also reported that in few instances, the infected individuals may be asymptomatic, i.e., they may not show any of the mentioned symptoms. People who had come in groups with suspected patients were also sent to quarantine. There were special teams in each area in all 14 districts of Kerala to organize the route maps of every infected person. They tracked every suspected person, once they landed in Kerala or has been in contact with an infected person. The tracking continued till the suspect was admitted to the hospital.

Route map included the place and time at which the infected person was present. Later, it was circulated to the general public by means of newspapers and different social media platforms. This was to make all those who came into contact with the infected person to be alert and to access preventive health care as soon as possible. All the migrant staffs that came from different countries were asked to go into quarantine as per the Kerala Government's instruction. The admitted patients were given food and even wifi access. Taking into consideration the mental health of Covid patients, they were additionally given counseling sessions from the health department. Multiple health centers started working to improve the psychological state of the people who were in isolation wards and in home quarantine. The government has taken measures to improve at-home internet experiences by asking the web service suppliers to extend network capability and information

measure within the state. This was done to satisfy the demand of individuals, as many of individuals were working from home and school and college-going students had online classes. It was made sure that Sanitizers were being created in enough quantities to meet the requirements of the state. They were made in bulk quantities with the assistance of aid teams, jail inmates, youth organizations etc. There were community kitchens in the state being operational that delivered food packets to sixty-seven thousand individuals daily in wake of the coronavirus pandemic. Within the state and in Karnataka borders, medical checkups were there for the individuals getting into the state by rail and road. "Break the Chain" is the campaign initiated by Kerala government to encourage hand washing/sanitizing and to stop the spread of the virus.

There were widespread reports of individuals violating the protection norms publicly. People who didn't use masks publicly were forced to pay a small fine and if they repeated the violation of rule, they were fined with an amount of Rs.5000.

E-Sanjeevani is a telemedicine platform that has been launched and has been put to use effectively by the government. It was developed by Center for Development of Advanced Computing (CDAC). It helps in avoiding direct interface with doctors throughout the pandemic. The state is determined to go forth with e-Sanjeevani as this can be a good consultation platform that offers high utility options and other advantages. It benefits elder people by reducing the risk of exposure and availing services at fingertips. The Health minister mentioned about strengthening this platform by giving regular health consultations. Currently the platform receives a number of calls daily that are being attended by efficient

doctors. [11]

The containment strategy of Kerala can be applied to other districts across the country, particularly hotspots. In the district of Kasargod, Kerala, there was a 76 percent reduction in positive cases within two weeks of triple-lock containment, with zero new cases reported from May 1, 2020 to May 11, 2020. Kerala implemented a triple-lock containment strategy, focusing on the use of technology such as GIS, drones, and motorcycle patrolling for monitoring purposes. [12]

As the pandemic entered 2021, initial successes in the Kerala model appeared to decline, with Kerala reporting over 1.1 million cases as of March 2021. However when India entered into a deadly second wave in Spring 2021 – compared to other states, Kerala being better prepared managed the pandemic much better and had enough supplies of oxygen, ventilators, and ICU beds. Kerala government made sure that testing was done extensively, which perhaps accounted for Kerala's high COVID-19 case count but reflects a more accurate number compared to states that have been accused of undercounting and undertesting. [13] In June 2020, Karnataka government started a graded reopening. Following which, the Wave-1 began gradually building up and reached a maximum daily confirmed caseload of 10000(7-day average) around 11 October 2020. Afterwards, the daily confirmed caseload declined to less than 1K by December 2020. Cases stayed below 1000 until mid-March 2021. From the 3rd week of March 2021, the number of cases started to escalate again, and was on the verge of entering Wave-2 of the pandemic. It reached a peak of 47500 daily confirmed cases on 9 May 2021.

Since 16 January 2021, vaccination against Covid-19 started in India. The vaccine was only given to certain age group at the time.

According to genome sequencing studies, Wave-1 was caused by the B.1.1.7 ('Alpha') variant and Wave-2 was caused by the B.1.617.2 ('Delta') variant. There was a concern due to the high load on the medical infrastructure with reports of ICU and oxygen shortages despite timely NPIs (decentralized state-wise, city-wise, and community-wise lockdown). [14]

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