



What was right about Kerala's response to the COVID-19 pandemic?

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INTRODUCTION

COVID-19 was declared as a 'Public Health Emergency of International Concern' by WHO on 30 January 2020.¹ As on 29 June 2020, the disease has affected more than 10 million individuals, spread to all countries of the world and has led to death of 0.5 million.² In India the count of those affected by COVID-19 has crossed 5.4 million with a death toll of 16 487, with Maharashtra reporting the highest number of infections (0.16 million cases) followed by Delhi (83 077), Tamil Nadu (82 275) and Gujarat (31 397), as on 29 June 2020.³

In India, Kerala was the first state affected by COVID-19, and the first coronavirus case was confirmed in Thrissur district on 30 January 2020. By early March the state soon had the highest number of active cases in India mainly due to a huge number of cases imported from other countries and states. Using the five components of trace, quarantine, test, isolate and treat, by 10 June 2020, Kerala managed to keep the basic reproduction number at 0.45⁴ against the India and world averages of 1.22⁵ and 3⁴, respectively. The exemplary manner in which the state has been fighting the pandemic is clear through its efforts to flatten the curve (*figure 1*). As of today, the state is among those with a high recovery rate, low death rate and slow progression of COVID-19 cases in the country, and has been recognised for its efforts by policymakers, public, researchers and clinicians, in India and internationally. *Table 1* provides comparative statistics of Kerala state in comparison to India and other countries. The objective of this commentary is to narrate key strategies adopted by the state of Kerala, which could be replicated in other states and countries.

LOCAL SETTING

Kerala has made impressive improvements in the quality of life indicators of her citizens.

Summary box

- ▶ Kerala is among the states, that has high recovery rate, low death rate and slow progression, of COVID-19 cases in India.
- ▶ The actions taken by the Government of Kerala in managing and controlling the COVID-19 pandemic is recognised by policymakers, public, researchers and clinicians, in India and internationally.
- ▶ The COVID-19 management and control received the highest political and administrative commitment with proactive timely interventions.
- ▶ Despite having a low per capita income, the state has its social development indicators, such as human development index, infant mortality rate, sex ratio and female literacy rates, comparable to those of many developed countries.
- ▶ Several key strategies implemented by the state; surveillance, good quality quarantine, testing strategies, uninterrupted treatment services, community participation, proactive care of elderly and people with comorbidity and educational and social mobilisation of behavioural change, contributed to effective management and control of COVID-19 in Kerala.

Despite having a low per capita income, its indicators of social development—such as the human development index (0.84),⁶ infant mortality rate (12/1000 live births),⁷ sex ratio (1084 females to 1000 males)⁸ and female literacy rates (92.07%)⁹ are comparable to those of many developed countries. Kerala, with a population of about 35 million,⁹ has a high population density of about 860 people per square kilometre.⁸

Kerala has 3.5 to 4 million inter-state migrant workers.¹⁰ Proportion of elderly (>60 years) is 12.6% of the total population.¹¹ Among Indian states, the prevalence of cardiovascular diseases is reported to be highest in Kerala (>5000/100 000 population) including ischaemic heart disease (>2250/100 000) and stroke (>625/100 000).¹² Prevalence of high blood pressure and diabetes is also very high with approximately one in three adults having hypertension¹³ and

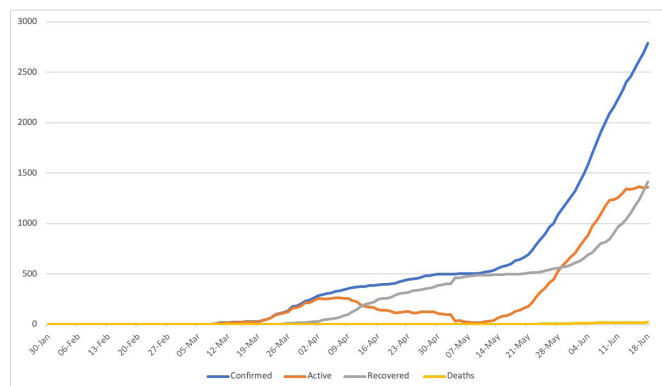


Figure 1 Cumulative summary of COVID-19 statistics: Kerala state (Source: Authors calculations. Data extracted from <http://dashboard.kerala.gov.in>).

one in five adults having diabetes.¹⁴ It is estimated that there are more than 2.4 million Keralites living in various countries, a vast majority in Middle Eastern Countries, and their remittances to the state net domestic product was nearly 36.5 per cent.¹⁵

Primary healthcare services has been organised systematically with a network extending to the village level. There are 230 community health centres and 845 primary health centres (approximately one per 30 000 population) in the State.¹⁶ There are 5320 female junior public health nurses and 4728 junior public health inspectors (about 50% women) working as multi-purpose health workers (MPHW), that is, two MPHW serving every 5000 population.¹⁷ Accredited Social Health Activists (ASHAs), who are community health volunteers, approximate one for every 1000 to 1500 population.

Local self-governance (LSG), which is a form of democratic decentralisation, is very active in Kerala. It implies transference of the power of rule to the lowest rungs of the political order.¹⁸ Rural LSGs cater to a population of 30 000 population and urban bodies cater

to a population of 100 000 to 300 000. 'Kudumbashree units' in Kerala—women self-help groups under the leadership of Local Self Government—is one of the largest women empowering projects in the country. Kudumbashree chooses a family-based approach; it reaches the family through women and the larger community through these families.¹⁹ Neighbourhood groups are the lowest tier consisting of 15 to 30 women members.

Eighty-five per cent of the COVID-19 cases in Kerala are imported from international borders and other states, and the rest are locally acquired. The state has confirmed that there is no evidence of community transmission based on a good regular sentinel surveillance activity among non-COVID-19 suspects. Samples from the state collected for a nation wise sero-surveillance using IgG also revealed a very low positivity rate in Kerala as compared with other states in India.²⁰

ADDRESSING THE COVID-19 THE KERALA WAY

Highest political and administrative commitment and proactive timely interventions were evident in the state as far as COVID-19 management was concerned. The lessons learnt from the last Nipah epidemic in 2018 and 2019 were not lost on the state health system which was in a state of alert even before the first case was reported. The success of containment and isolation strategies has hinged on the facts that there is a strong primary health system in place, active community participation and integration into a decentralised system of management at the panchayat/taluk and block levels built on a centralised epidemic control template laid out at the state health headquarters. The other important arm of the containment strategy has been the enforcement of lockdown by the local police. The health system was ready with detailed guidelines even before the first case was reported. Figure 2 provides the various milestones in the battle against COVID-19 in the state.

Table 1 Number of infections, deaths, case fatality rate (CFR) of various countries and Kerala

Country	Number of cases	Deaths	Recovered	CFR (%)	CFR (revised %)
Italy	240 310	34 738	188 891	14.46	15.53
Spain	295 850	28 343	150 376	9.58	15.86
France	162 936	29 778	75 649	18.28	28.25
Canada	103 250	8 522	66 191	8.25	11.41
USA	2 637 077	128 437	1 093 456	4.87	10.51
Brazil	1 345 254	57 658	733 848	4.29	7.28
China	83 512	4 634	78 640	5.55	5.56
Russia	634 437	9 073	399 087	1.43	2.22
Kerala	4 189	22	2 150	0.53	1.01
India	549 197	16 487	321 774	3.00	4.87

CFR calculations based on formula deaths/number of cases, revised CRF based on formula deaths/deaths+recovered as per methods presented in <https://science.thewire.in/the-sciences/covid-19-pandemic-case-fatality-rate-calculation/>.

Source: www.worldometer.com, all figures are for 29 June 2020; Spain: recovered from www.tradineconomics.com

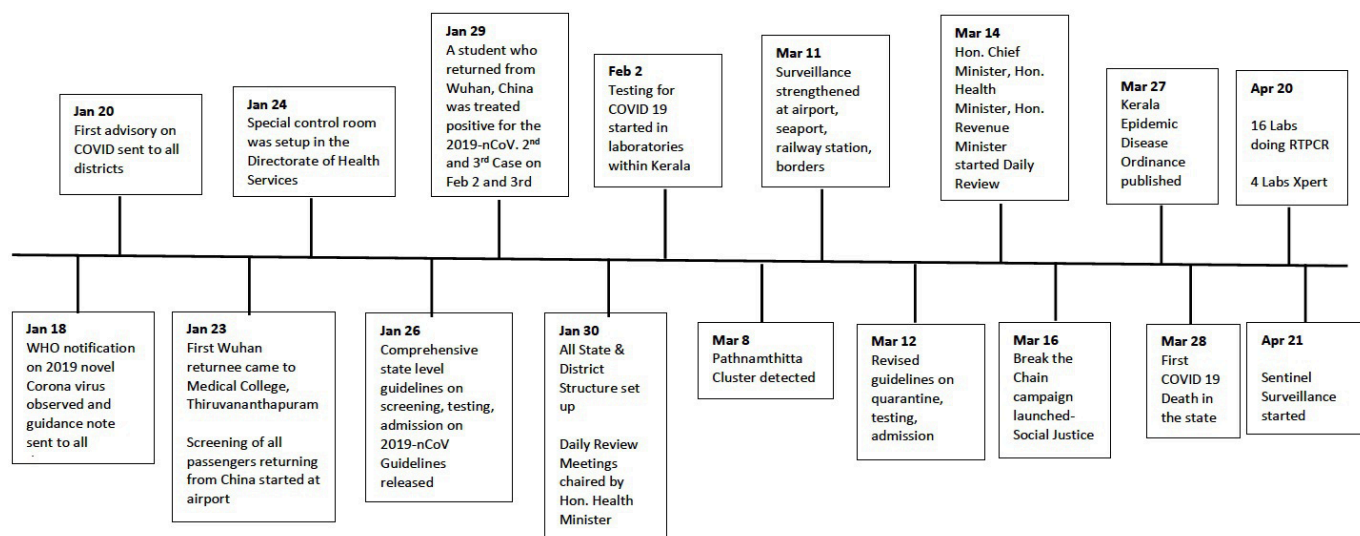


Figure 2 Milestones in the battle against COVID-19: Kerala state. Hon.,honourable; 2019-nCoV, novel coronavirus.

KEY STRATEGIES WHICH THE STATE ADOPTED FOR COVID-19 PREVENTION AND CONTROL

We present below several key strategies that the state of Kerala adopted for the prevention and control of COVID-19 in the state.

Surveillance activities

System was put in place for screening and follow-up of every individual who arrived in the state by air, sea, rail or road from other parts of India or abroad. The symptomatic passengers were taken directly to dedicated COVID-19 hospitals and admitted, tested and treated appropriately. The asymptomatic passengers were advised to follow strict home quarantine, avoid non-essential travel and community/social contact based on their country of origin and contact history. A 'sanitised corridor' protocol was followed for the travellers arriving at portal of entry to their concerned quarantine destinations with special double chambered taxis. If any individual from among the above-mentioned developed symptoms they would be shifted to the designated COVID-19 hospitals for testing and further management. There was a portal created for the same called the COVID-19 Jagratha Portal to facilitate the same.

A contact tracing system was put in place to trace all primary and secondary contacts of index cases for which field teams were formed, route maps of travel drawn with diligent follow-up on all contacts at the community level. Primary contacts are those contacts of laboratory confirmed COVID-19 cases and secondary contacts are the contacts of primary contacts. By ensuring both the primary and secondary contacts were put into quarantine it was assumed that a watertight compartment would be created to prevent the transmission of infection into the general population.

Ensuring good quality quarantine

The concept of home quarantine was promoted by the state upfront. Frontline health workers ensured

adherence to quarantine with the help of women self-help groups and local panchayat leaders at field. Field workers of the health system were responsible for the initial counselling, education and timely support to those under quarantine as and when needed. The state was also successful in establishing systems to address medical, non-medical and psychological needs of those under quarantine. People without facility for quarantine at their residence, those without bath attached exclusive rooms or those who had vulnerable individuals at home were offered quarantine facilities at institution. People friendly polices also monitored quarantine violations.

Testing strategies

The leadership never attempted to chase testing targets, but focussed on testing all eligible individuals in a timely manner. The leadership seem to have focussed on the principle of 'quarantine-quarantine-quarantine' rather than 'test-test-test'. The comprehensive testing strategy was backed by a strong public health approach and epidemiological inputs. This made the testing strategy of the state smart and intelligent with effective usage of resources.

Apart from these, the state initiated a Sentinel Surveillance (samples from seven groups of non-COVID-19 suspects) to pick up any early evidences for community transmission.

Uninterrupted treatment services

Twenty-seven dedicated COVID-19 hospitals were set up. All confirmed cases were shifted immediately and managed at COVID-19 hospitals until they became negative. At the same time, the state ensured uninterrupted treatment services to the non-COVID-19 patients, especially for conditions like non-communicable diseases, cancer care, special conditions like haemophilia, thalassemia and haemodialysis and so on.

Triage system was set up at all hospitals and COVID-19 and non-COVID-19 tract were established. COVID-19 suspects were isolated and tested.

Simultaneously teleconsultation was held and medicines were delivered at door steps to elderly individuals from the primary health centres.

Community participation

State focussed on educating and empowering every citizen to follow the advisory. 'Healthy volunteers' services were used to the maximum for screening of passengers, addressing needs of houses under quarantine including community kitchens, medicine delivery and the care of elderly/palliative care patients. Kudumbashree members visited all households with adequate precautions, educated elderly people, provided psychological support and ensured continuity of care for them.

Proactive care of elderly and people with comorbidity

Village wise lists of people above the age of 60 with morbidity were prepared. Women self-help group members, volunteers and palliative care teams contacted all individuals and their family based on the line list for education on special precautions. ASHAs with the support of health system frontline workers did regular surveillance of elderly and people with morbidity to address their medical needs. The state has been successful until now in containing the infection among healthy and controlling transmission to the vulnerable. This again is one of the important reasons for low case fatality despite high general morbidity of cardiovascular risk factors in the community.

Education and social mobilisation for behavioural change

'Break the chain campaign'—a campaign for behaviour change communication focussing on physical distancing, handwashing and using face masks were put in place. Chief Minister of the state conducted regular detailed press briefings every day at a fixed time for communicating to citizens.

Thrust was on community education by ASHAs, women self-help group members and panchayat leaders and mass media and social media campaigns focussing on basic concepts of prevention.

CONCLUSION

Kerala has not done anything extraordinary. What the state followed was a proactive and timely approach within the basics of quarantine, infection prevention and control with the highest political and administrative commitment. The strong public health system, with reach to every households in the state and the empowered and literate community has helped the state to combat the pandemic as a joint effort. Interdepartmental coordination from the highest administrative levels to the village level was visible. The state has extended special care to all including migrant workers during the lockdown period. Logistics and supply chain management was done meticulously with even indigenous production of personal protective equipment.

The state had experiences with the Nipah virus outbreaks in two consecutive years, 2018 and 2019. The lessons learnt about contact tracing and surveillance during Nipah has helped the system to set up a robust surveillance system. The system of active community participation, interdepartmental coordination, role of local self governments in proactive care of citizens and social mobilisation through women self-help group members in Kerala came to the fore during the massive flood of a level 3 nature in 2018. Such active involvement of all the stakeholders who complement each has worked in Kerala's favour, many may argue that these are not measures put in place to fight coronavirus but what has been a legacy of the State. Every state or society has the alternative to the 'Kudumbashree' and 'Local Self Governments.' What Kerala tells is to use them effectively for health and social interventions in a customised way.

In summary, a proactive state government, executive and administration, along with a strong public health system backed by the community participation is what ensured a limited spread in a densely populated state like Kerala with a large non-resident population. The system of ensuring quarantine and isolation of all 'at risk' individuals and at the same time protecting the vulnerable through 'ring fencing' has certainly helped lowering the case fatality in the state. The lessons from Kerala state underline the importance of a strong public health system with active community participation for the management and control of COVID-19 pandemic.

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Contributors JCM conceived the idea for the study along with DJ. JCM and PSR organised the details, and wrote the first draft of the manuscript. DJ organised data for figures and tables. TR and AM provided inputs into the first draft of the manuscript. All authors approved the final version of the manuscript.

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