

Review Article

India seems to outperform in handling COVID-19 pandemic

Anita Garg Mangla, Shreya Kandpal, Parthvi Mahendru, Neeru Dhamija*

Department of Biochemistry, Daulat Ram College, University of Delhi, Delhi, India

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***Correspondence:**

Dr. Neeru Dhamija,

E-mail: neerudhamija83@gmail.com

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ABSTRACT

The coronavirus pandemic is an ongoing pandemic of coronavirus disease 2019 caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2). The outbreak was first identified in Wuhan, China and soon within months it engulfed more than 188 countries. As of 25 January 2020, more than 100 million cases have been reported globally. Worst affected countries globally include USA, India, Brazil, Russian, UK, France, Turkey, Italy, Spain and Germany. By far India has taken robust immediate measures to contain the spread of virus by implementing stringent nationwide lockdowns at an early stage. This review focuses on how India, in several ways, is placed better in handling COVID-19 than the developed countries.

Keywords: COVID-19, India, WHO, Test

INTRODUCTION

The world is currently facing a coronavirus pandemic, COVID-19 (formerly known as SARS-CoV-2), coronavirus disease 2019 by WHO. COVID-19, beginning in the Wuhan province of China in mid-November 2019, started to spread across other countries. By 13 January 2020, the first case of the novel corona-virus (COVID-19) was reported outside China, in Thailand and then in Japan and South Korea.¹ This was an alarm for other countries to take preventive measures as the number of cases in China and other countries started to increase at a rapid rate. By 23 January 2020, more than 550 people got infected in many countries. Due to sudden spurt in the number of cases, reaching thousands in a single day, WHO declared this as a global health emergency on 30 January 2020.² It was declared a pandemic by WHO on 11 March 2020.¹

Initial measures taken in India to contain the pandemic

The first COVID-19 case in Kerala state of India was reported on 30 January 2020 of a student who had returned from Wuhan China.² There was not very significant rise in

the COVID-19 cases in India till first week of March, but the number of reported cases crossed 100 till 15 March 2020. Countries like India and US started screening people in February (for temperature and any symptoms of cough or cold) travelling from China and later those travelling from other countries too and asked them to home quarantine for 14 days. These measures by the government were not enough because during the incubation time of the virus the person shows no significant symptoms thus tends to be an asymptomatic carrier of the disease. Due to air-to-air transmission and longer incubation period of the virus, it spread across nations making it urgent for all countries to take up sudden and strict actions to stop its spread. As the virus was seen to be highly contagious in countries like Italy and USA, where population is less and healthcare facilities are better than that of India, the government of India was forced to take strict measures to contain the further spread of the virus. After the detection of the first case, Indian government started to spread awareness amongst people through advertisements on social distancing, usage of masks and hand-washing to avoid the contact of virus. Additionally, Aarogya Setu app was launched on 2 April 2020 promoted by the Ministry of

Economics and Information Technology which provides its users a self-assessment survey on their health condition and their locations to be tracked by device bluetooth or GPS till they test positive for the disease and their positive status for the disease is uploaded on the government servers.³

On 12 March 2020 Delhi's Chief Minister made the Epidemic Diseases Act, 1897 applicable in the capital of India. As a result of which, all the schools, colleges and cinema halls were closed till 31 March 2020.⁴ Before 21 March all the public gatherings including IPL matches too had been called off. The domestic and international flights were halted from 23-31 March, borders were sealed and only essential services were given permission to continue.

Even though Kerala was the first state to have reported COVID infection, it had a better control over increase in numbers due to the experience gained in previous encounter with Nipah virus, by testing, isolating and contact tracing.⁵

On 22 March, the government of India declared a nationwide 14-hour curfew followed by three complete national lockdowns from 24 March 2020 for 56 days to minimize the spread of disease and stressed on the importance of social distancing among people. All the airports were sealed in the country. All the other means of transportation were also stopped.²

Developed countries like the USA did not impose stringent lockdown while Indian lockdown was deemed very strict and was responsible for the control of the spread of virus. This is one of the major reasons for India doing better than developed countries even now in handling COVID-19. During this time, the government increased the number of testing and treatment facilities to prepare for a surge in infections. Railway coaches were also converted to accommodate COVID patients to substitute for shortage of hospitals.⁵

Initially with no vaccines and treatments approved for COVID-19, Ministry of AYUSH, government of India recommended to use kadha as an immunity booster. It can also be used to decrease the severity of the disease in the infected individuals. Kadha is a decoction of various herbs containing numerous phytochemicals which also imparts it anti-inflammatory properties.⁶

Comparison of India versus other developed countries

India seems to be faring better than other developed nations, despite having more than twice the population density. The USA has a population density of 36 sq km which is much lower than that of India, 464 sq km. The ratio of population density of India to that of developed nations such as the USA, UK and France comes out to be 12.9:1:7.8:3.3 whereas the ratio of their total cases per million comes out to be 1:10.1:7:6.08. Ratio of population density of India to other developing nations such as Brazil,

Russia and Turkey comes out to be 51.6:2.8:1:12.2 whereas the ratio of their total cases per million comes out to be 1:5.4:3.3:3.7 (Figure 1).⁷ This shows that India has a much better control over COVID-19 when compared to other developing as well as developed nations.

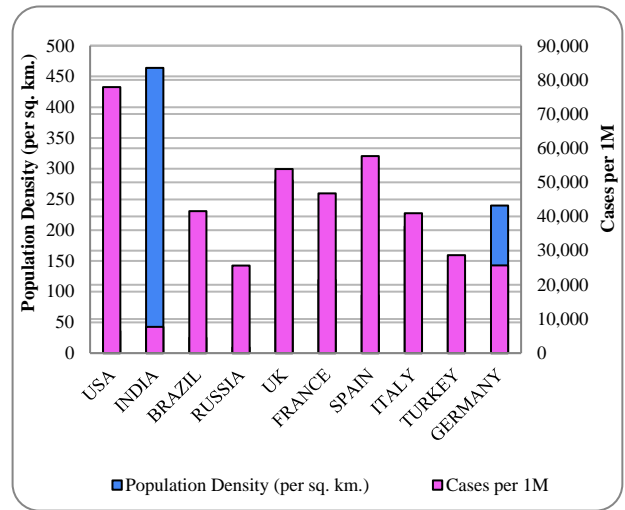


Figure 1: Comparison of population density and total COVID-19 cases per million in 10 different countries across the world. (data as on 25 January 2021).^{7,8}

India has one of the lowest mortality rates amongst the worst affected nations. Developed countries like USA, UK, France, Italy and Germany all have a higher percentage mortality as compared to a developing nation, India, whose recovery rate is the highest amongst the developed as well as other developing nations.

Comparing top 10 worst hit countries with covid cases on the basis of percentage mortality and percentage recovery, India seems to be making a mark in handling COVID-19 better in spite of the fact that developed countries have better healthcare facilities and sanitation (Figure 2).

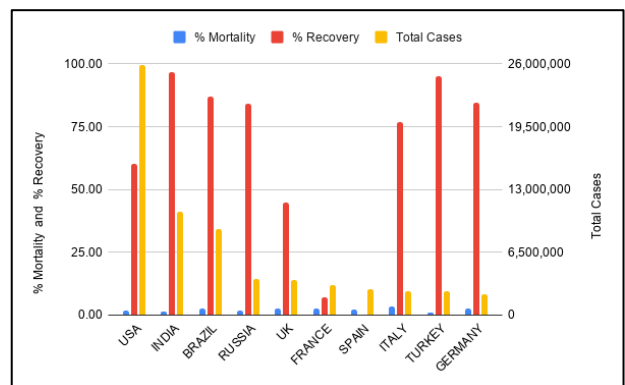


Figure 2: % Mortality, % Recovery and total cases in 10 countries. (data as on 25 January 2021).^{7,8}

Among the top ten affected countries, India has the lowest percentage of adults who smoke (as of 2016) and the lowest cigarette consumption per smoker (as of 2012).⁹ A

number of studies have shown the link between smoking and the severity of COVID-19. As the lung epithelial cells are targeted by the virus, patients with COPD show more severe progression of disease. Smoking leads to COPD and it may thus affect severity of disease. It has been shown that there is an approximately 1.5-fold increase in severity of disease and subsequent ICU admission in smokers over non-smokers, when results of different studies were pooled. A systematic meta-analysis showed that there was an increased risk for developing severe COVID-19 in active and former smokers. It also showed that 48% former smokers and 24% active smokers developed serious complications.¹⁰ COVID-19 uses angiotensin-converting enzyme (ACE-2) as a receptor to enter cells in lungs. ACE-2 is upregulated in patients with COPD and active smokers which may increase risk of infection.¹⁰

Other comorbidities associated directly and indirectly with the increased risk of infection and development of severe COVID-19 include cardiovascular diseases, diabetes, obesity, asthma and cancer.^{11,12} Amongst the top ten countries, India has the second highest death rate from cardiovascular diseases (2017) and the third highest prevalence of diabetes (2017).^{13, 14}

However, the percentage of overweight and obese individuals is much lesser than all the countries (2016). It is around one-third or lower than the rest.¹⁵ Prevalence of asthma and cancer was also found to be lowest in India (2017).^{16,17} In fact the prevalence of cancer per 100,000 people is lower than one-tenth of the USA.¹⁷

Thus lower prevalence of comorbidities may be one of the reasons why India has a lower mortality rate and the highest recovery rate when compared to other countries. Some studies suggest a decreased mortality rate may also be due to prior infections with gram negative bacteria (especially *E. coli*) and poor quality of water.¹⁸ BCG vaccine given for tuberculosis in India, like any vaccine elicits an innate immune response and is expected to decrease the viral load.¹⁸

However, there are other theories presented that explain India's high recovery rates and low death rates due to COVID-19 in contrast to developed countries. Of India's total population, 34.33% is expected to be the youth and as it's seen that there is a greater mortality in the elderly people due to COVID-19. It was found in a study that Indians have a higher number of natural killer cells which mount an early immune response and terminate infections, including COVID-19.¹⁹

India started with a low testing rate of 539 tests per million (ranking 52nd globally in terms of testing rates) due to very few labs and trained technicians along with lack of kits.²⁰ This rate improved significantly with involvement of new labs, rapid response teams and research groups under the National Task Force.²⁰ By 10 December 2020, India conducted 150.76 million tests globally ranking 22nd

in terms of testing. The number of people tested for the disease does not represent the total infected population (which is much higher), still, conducting tests and recording their results as in below Figure gives an estimate of the extent to which the disease might have spread in a certain region. Confirmed cases are based on positive results from widely used PCR test. As per the ICMR data, 193.06 million samples have been tested till 25 January 2021 (Figure 3).^{20,21}

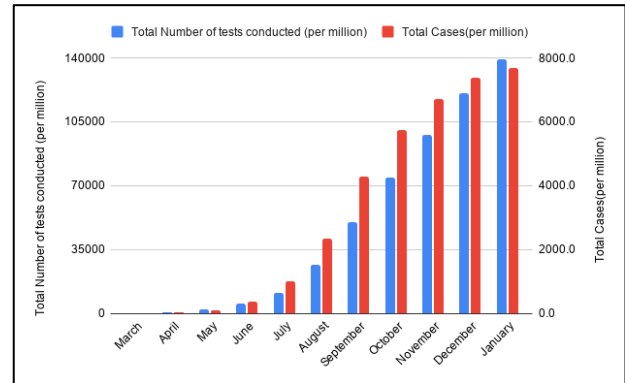


Figure 3: Total number of tests (per million population) conducted and total cases (per million) in India in 2020-2021 (data as on 25 January 2021).⁷

As India is a developing country, there was a shortage of testing kits initially. Thus, the government placed a strict lockdown on its citizens and contacts of confirmed cases were rigorously traced and quarantined. They were tested only when they developed the symptoms of COVID-19. Public health workers went door to door to check people for symptoms and test them, isolating the affected ones. There could have been many asymptomatic cases that went undetected leading to a lower number of total cases.²²

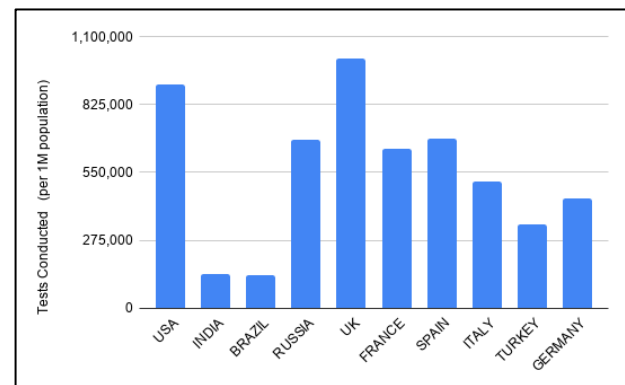


Figure 4: Total number of tests conducted per million population in 10 countries. (data as on 25 January 2021).⁷

Even though the total number of tests conducted has increased significantly since the beginning of the pandemic, testing per million population still remains the lowest in India, among the top ten countries (Figure 4). This may be the reason for a lower number of cases.⁷ India

has a higher percentage of youth. They are less likely than elderly people to develop serious disease.¹⁹ It has also been shown that children and teenagers have a higher chance of being asymptomatic. It may be because children have lower expression of ACE-2 which increases with age.²³ Many cases in India would thus have been asymptomatic and evaded detection.

As of 3 July 2020, Ministry of health and family welfare recommended the use of antivirals like hydroxychloroquine, corticosteroids like methylprednisolone or dexamethasone for moderately ill patients while for severely ill patients in addition to the corticosteroids, tocilizumab (anti-IL6) may be used.²⁴ The Ministry of health and family welfare also mentioned the use of some drugs and therapies in a specific section of patients (remdesivir, convalescent plasma and tocilizumab).²

After strict lockdowns till 7 June 2020, India saw a series of unlocks. Unlock 1.0 began on 8 June 2020 and services started resuming in a phased manner. Slowly and gradually, the Indian government eased the restrictions and India saw another unlock, unlock 2.0 from 1 July 2020 to 31 July 2020. Unlock 3.0 was announced for the month of August. Similarly, unlock 4.0, 5.0, 6.0 for the months of September, October, November and so on.²⁵

Voluntary vaccination drive was launched in India on 16 January 2021. Before this a nationwide mock drill was held on 2 January, to ensure smooth running of the massive drive. COVISHIELD and COVAXIN were provided by the government, both manufactured in India, by Serum Institute of India limited and Bharat biotech International Private Limited respectively. The first group to be vaccinated includes healthcare and frontline workers. This will be followed by people over 50 years of age and those under 50 years of age having comorbid conditions. By 24 January, 1.6 million health workers had been vaccinated.^{24, 26}

During the first few months when the pandemic had hit India, we had little information about the virus other than it caused respiratory infection and could lead to severe health consequences. The government of India was rushing to improve the healthcare facilities while the medical staff could only give symptomatic treatment. Now, with new scientific information pouring in about the virus, better approaches being adopted to treat covid patients and with the commencements of vaccination drives, India seems to be placed in a better position in handling COVID-19.

DISCUSSION

The success of a complete and severe lockdown in India is attributed to the joint family system prevalent from ages. The strength of family support and bonding in joint families has proved beneficial in maintaining a stringent lockdown in India and has succeeded in preventing a large number of infections. Both emotional and mental health of

humans raised and living in joint families is quite positive and they imbibe the qualities of sharing, caring, empathy and understanding which are all that is the need of the hour during such a pandemic and complete lockdown. It not only breeds social cohesion and democratic thinking, it also promotes and embodies the spirit humanism, compassion, magnanimity and harmony along with a great deal of tolerance and perseverance. All these are essential components of a society when such a pandemic has severe health and economic challenges impacting the individuals.

India seems to be performing better than other developed nations and surprisingly much lower number of COVID-19 deaths reported even as the number of cases surge. Many reasons that could be attributed to this are a high percentage of -young and rural population, inconsistent weather with selective pressure of immunity genes in the population to have been selected under pressure due to many small infections that spread in changing seasons and poor medical aid. Also, the BCG vaccine for tuberculosis which is given in many countries including India and the high amount of sunlight that the country gets throughout the year can prove to be a natural germicide and can kill the virus effectively. It can also be argued that the spread of COVID-19 in India is low as of now due to poorly low testing rates. This might also be the case with many more developing countries especially in temperate zones as high temperature may significantly contribute to the containment of virus.²⁷ What needs to be seen is that will India keep outperforming in the coming future too.

Several theories have spawned in the last few days implying that Indian immunity is quite strong as they have been constantly exposed to many microbes in the past and have evolved to protect themselves against pathogens. Their dense population and poor hygiene as compared to those of developed countries has led to gain genetic advantage in safeguarding them against viral infections as they have been fighting many other infections both viral and bacterial, sometimes even more than once in their life span. Living with poor sanitation and degrading environmental conditions have equipped their immune systems strongly to combat Ebola, SARS and Zika assaults and have helped them with lower mortality rates with COVID-19. As a range of mortality rates have been observed for different countries ranging from 1.04% to 3.47% with covid infections, Indian mortality rate is 1.44% owing to its potential immune system complemented by both genetic and regional advantages.

CONCLUSION

As of 25 January 2021, more than 100 million cases of COVID-19 have been reported worldwide and India stands at the second position among the top ten worst hit countries. India is still faring better than other developed and developing nations in containing the spread of the disease.

Despite having the highest population density and inadequate healthcare facilities, timely intervention and strict measures has led to the lowest number of cases per million population. India's highest recovery and low mortality rates can be attributed to lower prevalence of comorbidities, higher proportion of youth and better immunity of Indians. With the vaccination drive underway, citizens still need to adhere to social distancing protocols put in place by the government. Following good personal hygiene and changing lifestyle to improve immunity by citizens has tremendously helped in reducing daily increase in cases as well as mortality rates. Government is focusing on areas of vaccine development and healthcare facilities, which will not only help us fight the current pandemic, but also prepare us for the future.

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