Impact of lockdown to control over Novel Coronavirus and COVID-19 in India

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ABSTRACT

Background: The world is going through a pandemic caused by newly emerged “Novel Coronavirus,” which was originated from Wuhan, China in December 2019. This pandemic caused havoc in the world. So far, more than 200 countries have been affected by Novel Coronavirus. India is also not untouched by this outbreak. The corona virus transmits through droplets, contact, and fomites in human and become a chain transmission by human to human. SARS-CoV-2 spread worldwide by air transport, and it is also reaches to local and small societies or villages by domestic transport through the travelers. Methods: In this study, data are accessed from Ministry of Health and Family Affaires, Ministry of Home affairs, Ministry of Transport, Government of India, World health organization, and www.worldometers.info. The accessed data are analyzed by origin 6.1 software. Results: In India, till April 8, 2020, 5274 people were found infected with COVID-19, out of which 410 were recovered, and the remaining 149 died. The infection of SARS-CoV-2 reaches to several places by international and domestic through human travelers. To avoid local and community transmission in India, it was decided for complete lockdown of 21 days from March 25, 2020 in country to prevent mass gathering and promote social distancing. Further, the lockdown was extended to May 3, 2020. The decision of lockdown has been successful in getting control of COVID-19 in India so far. Conclusions: The effective measure of lockdown to control COVID-19 was found to be very successful in India and it can be apply by other countries to control the COVID-19.

Keywords: COVID-19, lockdown, Novel Coronavirus, pandemic, SARS-CoV-2, transmission

Introduction

The world is facing the global health emergency that was created due to novel coronavirus and its associated “coronavirus disease-2019” (COVID-19). The first case of COVID-19 was reported in Wuhan, China, on December 2019, and there after a series of similar cases were found in the city. The cases of COVID-19 were also recognized in other nations that are related with travel history or contact transmission of infected travelers from Wuhan, China.[1] The previous outbreaks of severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle east respiratory syndrome coronavirus provide the little bit help for identifying the nature of 2019-nCoV. The natural reservoir of coronaviruses is bats and transmitted in human by host intermediate of wild animals. Due to similarity of 2019-nCoV with SARS-CoV, the International Committee on Taxonomy of Viruses has announced it as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).[2]

The transmission of SARS-CoV-2 was occurred in human-to-human through droplets of sneeze, cough or talk, and contact with infected person. The transmission of SARS-CoV-2 from bats to human and society can be understood by Figure 1. The bats are considered to be the natural reservoir hosts of SARS-CoV-2, after which it is transmitted to humans through an intermediate unknown host. Infected humans infect again the people of the society around them and also spread the
reach the COVID-19 from urban to rural.\(^7\) The success story of lockdown is not limited to China, but it is also found very efficient in controlling the COVID-19 from New Zealand.\(^{13}\)

The single religious mass gathering event in Malaysia spread the COVID-19 in several countries.\(^{14}\)

India is the second largest populous (1.3 billion population) country of the world. As per the National Highways Authority of India, the roads covers the about 65% of freight and 80% passenger traffic. Out of 80% passenger traffic, 90% of the trips are done through buses. The Indian Railways is the second main travel medium and is the busiest network in the world. More than 18 million passengers and 2 million tons of freight are daily transported by trains.\(^{13}\) Thus, public transport may play the crucial role for spreading the infection of SARS-CoV-2 in India. To ensure the physical or social distancing in country, it is essential to control the mass gathering and public transport. Thus, the Government of India (GOI) has decided for lockdown from 25 March 2020. The present research attempts to see the impact of lockdown in India for control of SARS-CoV-2 and COVID-19.

**Methods**

In present study, the data of confirmed infected cases of COVID-19 are collected from Ministry of Health and Family Affairs and www.worldometers.info. The government orders and advisories are accessed from Ministry of Home Affairs, Ministry of Transport, GOI, and World Health Organization. Several information are also accessed from social media, print, and electronic media, reports, and research articles. The number of confirmed infected cases and days are plotted with help of ORIGIN 6.1 software.

**Results**

Figure 2 indicates the variation of total number of corona infected cases with days. From figure, it is clear that the trajectory is forming smaller angle in case of India in comparison to United State of America, Italy, Spain, Germany, and France. This shows that the growth of infection is slower in India to others. Inset of Figure 2 depicts the growth of infected case variation with days in India. The exponential growth of infection was found in India as indicated variation curve is exponentially fitted. The value of coefficient of regression \(R^2\) is 0.99544, which is much closer to 1 and indicates the good fitting. In inset of Figure 2, a cross mark is indicated from which a drastic increase in number of infected cases was observed. The slower growth rate of infection with COVID-19 is caused by effective measure of social distancing, Janata Curfew, and lockdown. After the emergence of first SARS-CoV-2 infection case, GOI has implicated the various preventive norms for SARS-CoV-2. The infection of SARS-CoV-2 in the United States of America, Italy, Spain, Germany, India, and France began almost simultaneously around January 30, 2020, while India succeeded to a large extent in preventing the infection of the corona due to the application of

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**Figure 1**: Transmission of SARS-CoV-2 from bat to human and society spread

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**Figure 2**: The growth of infected case variation with days in India.
Quarantine and Isolation

Peoples who do not have symptoms of SARS-CoV-19 infection but are doubt to infection asked for quarantine of 14 days. The infected persons are sending for isolation to avoid further transmission. Individuals coming from Republic of Korea, Iran, and Italy or those having history of movement to these nations might be quarantine for 14 days on appearance to India as on February 26, 2020. Later on, every person is asked to quarantine for 14 days those having the symptoms of COVID-19 or in close contact with COVID-19-infected person. As a result of screening for COVID 19, about 15,991 passengers were send for home quarantine and 497 suspect cases are send in isolation who belong to 34 States/Union Territories.

Social distancing

Instead of highly preventive process of GoI, the government has surprised for 44 confirmed cases as on March 09, 2020. After declaring Coronavirus Disease (COVID-19) outbreak as a pandemic on March 11, 2020 by WHO, GoI has invoked powers under the Epidemic Diseases Act, 1897 to enhance preparedness and containment of the virus and declared COVID-19 a “notified disaster” under the Disaster Management Act 2005. In order to prevent local transmission, a measure was taken in the form of social distancing, in which the government advised to avoid mass gathering. School, colleges, Universities, cinema, pubs, music fest, and sport events were stopped to ensure social distancing. At first, such orders were given by Kerala and then one by one the other states of the country took similar measures. The state government of Uttar Pradesh has postponed the all University examination from March 18, 2020.

Janata curfew

Voluntary “Janata Curfew” was called by the Prime Minister of India, Shri Narendra Modi Ji on March 22, 2020 from 7 am to 9 pm. On the day of Janata Curfew, all public transport of the country including the passenger trains and air flights was closed. The peoples showed great restraint and followed the social dictating because all the roads, markets, and public places of the country were found completely empty.

Lockdown

It is very difficult to get control over COVID-19 through one-day voluntary Janata Curfew and social distancing. Therefore, there was a need to take some hard steps. Lockdown is the most appropriate decision as a preventive measure. Many states of the country decided to lockdown since March 31, 2020 in their states to control over COVID-19. The details of lockdown of state and central governments are listed in Table 1.

In view of the increasing cases of SARS-CoV-2 infection in the country and with the recommendation of National Disaster Management Authority, the Ministry of Home Affairs, GOI has decided lockdown of 21 days from March 25, 2020 which was effective in all parts of the country. Further, it was extended to May 3, 2020. All services, except medical, police, and food items, facilities closed in lockdown. Therefore, almost the whole of India will be closed by lockdown. All types of public and private transport are closed during lockdown. Moreover,
all passenger trains, metro trains, bus services, car services, and international and domestic flights are also closed from 25 March 2020 in the country. The closure of the transport proved to be the most important in effecting lockdown as it forced all people to live in their own homes. Instructions were given for home delivery of essential items like food, LPG gas, and general medicine to avoid mass grouping. Due to lockdown, all the states, districts, and cities in the country have been unlinked because the borders of states, districts, and cities have been sealed.\(^\text{[38]}\) All types of schools, colleges, and universities were also closed. Along with this, competitive examinations, weddings, meetings, seminars, conferences, and sports events in the country were also canceled or suspended. In most of the hospitals, the regular OPD was stopped, which could not affect the SARS-CoV-2 infection on other patients visiting the hospital. Phone consultation is started for general patients. Separate wards were also made for the patients of COVID-19. Moreover, the scheduled census 2021 was also postponed.\(^\text{[39]}\) For the violation of any lockdown, the action under the relevant penal provisions of the disaster management act 2005 and Indian Penal Code shall be taken by the law enforcing agencies.\(^\text{[40]}\)

The impact of each measure taken to prevent infection of the coronavirus can be understood from Figure 3. From Figure 3, it can be concluded that educational institutes, cinema, malls, public and private industry, and public events are interconnected with each other. The major population is circulating in these places via public transport. The individuals participating in mentioned places are also exchanging their locations, cities and states, and also make contact with other individuals. The intersection areas among cinema and malls, public and private industry, educational institutes, and transport in Figure 3 indicate that the people exchanges their places using the common transport media and similarly the intersection areas among educational institutes, public event, public and private industry, and public transport show that the individuals of mentioned places uses the same media for transport from one place to other place. Moreover, the common areas between educational institutes and cinema and malls or between educational institutes and public event, or between public and private industry, and public event or between cinema and malls, and public and private industry indicates that few people are common in each two cases or few people are changing their locations in each two mentioned places. The areas of educational institutes and public/private industry are independent but share their area with public transport. This means that the people working in these places are independent, but few people working in these places share the common transport. Thus, a single infected human can prove to be very fatal in spreading the infection as shown in Figure 1 and

### Table 1: Lockdown action, place of execution, duration of lockdown, and order issuing authority

| Action                  | Place of execution       | Duration of execution     | Order issuing authority       | Date of decision   | Reference |
|-------------------------|--------------------------|---------------------------|-------------------------------|--------------------|-----------|
| Lockdown in states      | Kerala                   | March 23-31, 2020         | Government of Kerala          | 23.03.2020         | [20]      |
|                         | Madhya Pradesh           | March 23-31, 2020         | Government of Madhya Pradesh  | 22.03.2020         | [21]      |
|                         | Punjab                   | March 23-31, 2020         | Government of Punjab          | 23.03.2020         | [22]      |
|                         | Haryana                  | March 23-31, 2020         | Government of Haryana         | 23.03.2020         | [23]      |
|                         | Delhi                    | March 23-31, 2020         | Government of Delhi           | 22.03.2020         | [24]      |
|                         | West Bengal              | March 23-27, 2020         | Government of West Bengal      | 22.03.2020         | [25]      |
|                         | Chhattisgarh             | March 23-31, 2020         | Government of Chhattisgarh     | 23.03.2020         | [26]      |
|                         | Rajasthan                | March 23-31, 2020         | Government of Rajasthan       | 23.03.2020         | [27]      |
|                         | Assam                    | March 24-31, 2020         | Government of Assam           | 23.03.2020         | [28]      |
|                         | Bihar                    | March 23-31, 2020         | Government of Bihar           | 23.03.2020         | [29]      |
|                         | Gujarat                  | March 23-29, 2020         | Government of Gujarat         | 22.03.2020         | [30]      |
|                         | Maharashtra              | March 23-31, 2020         | Government of Maharashtra     | 22.03.2020         | [31]      |
|                         | Uttar Pradesh            | March 23-31, 2020         | Government of Uttar Pradesh   | 23.03.2020         | [32]      |
|                         | Maharashtra              | March 23-31, 2020         | Government of Maharashtra     | 22.03.2020         | [31]      |
|                         | Uttar Pradesh            | March 23-28, 2020         | Government of Odisha          | 21.03.2020         | [33]      |
|                         | Uttar Pradesh            | March 23-25, 2020         | Government of Uttar Pradesh   | 23.03.2020         | [34]      |
| Lockdown in specific districts | 75 district of India  | March 22-31, 2020         | Centre and State Governments  | 23.03.2020         | [35]      |
| Lockdown in specific districts | India | March 22, 2020          | On appeal of Prime Minister   | 20.03.2020         | [19]      |
| Country lockdown        | India                    | March 25-April 14, 2020 (21 days) | Ministry of Home affairs     | 24.04. 2020     | [36]      |
| Country lockdown        | India                    | April 15-May 3, 2020 (19 days) | Ministry of Home affairs     | 14.04.2020        | [37]      |
also correlating with Figure 3. From above discussion, it can be concluded that transport and travel media is very significant for the transmission of SARS-CoV-2. Quarantine and isolation were applied on a small scale, and its impact is also limited because before the onset of symptoms of infection any individual travels to several places and make contact with many peoples as indicated in Figure 3 and discussed above. Social distancing can be important to stop chain transmission, but it is difficult to convince people about the importance of COVID-19 through voluntary social distancing. Also, the effect of COVID-19 cannot be reduced much with one day Janata curfew. Therefore, lockdown itself is an effective method because it covers the condition of quarantine, isolation, and social distancing automatically. During the lockdown, the dark portion indicating the public transport in Figure 3 becomes empty and also portions showing the cinema and malls, educational institutes, public events, and public/private industry also became empty of humans. All people are forced to live in their houses with the effect of lockdown. Lockdown has already proved to be very important in the prevention and control of COVID-19 in China and New Zealand.[43]

A mass gathering was reported in New Delhi by several media and government authority in the Tabligh Jamaat in lockdown period. According to reports, there were about 1746 persons staying as on March 21, 2020 in Hazrat, Nizamuddin Markaz. Of these, 216 were foreigners and 1530 were Indians. So far, about 2137 such persons have been identified belonging to different states of the country.[42] About 30% of SARS-CoV-2 infected cases in India were found to be linked to the Tabligh Jamaat on April 5, 2020, and this increase is indicated in inset of Figure 2 with a cross mark.[43] On omitting the occurrence of gathering in Tabligh Jamaat, the trajectory of growth of infection is slight slower from the cross mark in Figure 2. Similar gathering was also observed in Malaysia, which plays a role for massive transmission of local and international spread of COVID-19 infections.[43] From the above discussion, it can be concluded that the decision of lockdown in India was found to be very effective for controlling the COVID-19. Lockdown in India has not only played the role to control COVID-19 but also it provides the time to government and hospitals to enhance its medical facility for COVID-19. During this period, the hospitals and wards were separated for COVID-19 and other disease. This period is also important in tracking the travel history of infected person due to limited contact. Moreover, lockdown is very significant for primary care physicians to control the rush of patients who are not suffering with major illness. Phone consultation during lockdown is also good for health of doctors and medical staff working for patients other than COVID-19.

**Conclusion**

The conclusion of this manuscript is described by given points:

- Today, the outbreak has spread to more than 200 countries of the world and India is also affected by COVID-19.
- The corona virus transmits from human to human via droplets during sneeze of cough and contact with infected individuals.
- The transmission chain of SARS-CoV-2 can be stopped by physical distancing.
- Keeping this in mind, India has declared country lockdown to prevent mass gathering and increase physical distancing.
- Due to the successful implementation of lockdown in India, COVID-19 has so far under control in the country instead of having very large population.
- Lockdown is also helpful to primary care physicians in dealing COVID-19 due to limited rush of patients other than this disease.
- Lockdown plays a very significant role in extending the medical facilities for treatment of COVID-19 and also developing the primary care facilities like personal protective equipments, N-95 masks, etc., for the doctors and medical staff.

**References**

1. Wang LS, Wang YR, Ye DW, Liu QQ. A review of the 2019 Noval Coronavirus (COVID 19) based on current evidence. Int J Antimicrob Agents 2020;105948. doi.org/10.1016/j.ijantimicag.2020.1059948.
2. Petrosillo N, Viceconte G, Ergonul O, Ippolito G, Petersen E. COVID-19, SARS and MERS: Are they closely related? Clin Microbiol Infect 2020;26:729-34.
3. Wilson ME, Chen LH. Travellers give wings to novel coronavirus (2019-nCoV). J Travel Med 2020;27:taaa015.
4. Bogoch II, Watts A, Thomas-Bachli A, Huber C, Kraemer MUG, Khan K. Potential for global spread of a novel coronavirus from China. J Trav Med 2020;27:taaa011.
5. Zhang X-A, Fan H. Importing coronavirus disease 2019 (COVID-19) into China after international air travel. Travel Med Infect Dis 2020;35:101620.
6. Liu X, Zhang D, Sun T, Li X, Zhang H. Containing COVID-19 in rural and remote areas: Experiences from China. J Travel Med 2020;27:taaa060.
7. Wilder-Smith A, Freedman DO. Isolation, quarantine, social distancing and community containment: Pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. J Travel Med 2020;27:taaa020.

**Conflicts of interest**

There are no conflicts of interest.

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8. Ebrahim SH, Memish ZA. COVID-19: the role of mass gatherings. Travel Med Inf Dis 2020;34:101617.
9. Shi P, Keskincok P, Swann JL, Lee BY. The impact of mass gatherings and holidays traveling on the course of an influenza pandemic: A computational model. BMC Public Health 2010;10:778.
10. McCloskey B, Zumbal A, Ippolito G, Blumberg L, Arbon P, Cicero A, et al. Mass gathering events and reducing global spread of COVID-19: A political and public health dilemma. Lancet 2020;395:1096-9.
11. https://en.wikipedia.org/wiki/List_of_events_affected_by_the_2019%E2%80%9320_coronavirus_pandemic.
12. Lau H, Khosrawipour V, Kocbach P, Mikolajczyk A, Schubert J, Banja J, et al. The positive impact of lockdown in Wuhan on containing the COVID-19 outbreak in China. 2020;27:taaa037.
13. Cousins S. New Zealand eliminates COVID-19. 2020;395:1474.
14. Mat NFC, Edinur HA, Razab MKAA, Safuan S. A single mass gathering resulted in massive transmission of COVID-19 infections in Malaysia with further international spread. J Travel Med 2020;taaa059. Published online 2020 Apr 18. doi: 10.1093/htm/taaa059
15. https://en.wikipedia.org/wiki/Transport_in_India.
16. https://www.mohfw.gov.in/covid-19/.
17. https://www.mygov.in/covid-19/.
18. https://www.indiatoday.in/education-today/news/story/list-of-exams-postponed-in-india-due-to-coronavirus-covid-19-outbreak-1658108-2020-03-21.
19. https://www.thehindubusinessline.com/news/pm-modi-calls-for-janta-curfew-on-march-22-from-7-am-9-pm/article31110155.ece#.
20. https://mha.gov.in/sites/default/files/MHAorder%20copy.pdf.
21. https://mha.gov.in/sites/default/files/MHA%20DO%20letter%20dt.14.4.2020%20Chief%20Secretaries%20Administrators%20DGPs%20and%20CP%20Delhi%20for%20ensuring%20lockdown%20measures%20during%20extended%20period.pdf.
22. https://mha.gov.in/sites/default/files/PR_Consolidated%20Guideline%20MA%280320%20%281%29_1.PDF.
23. https://mha.gov.in/sites/default/files/PR_CensusnPPostponed_26032020.pdf.
24. https://mha.gov.in/sites/default/files/DO%20letter%20dated%2010.4.2020%20Chief%20Secretaries%20Administrators%20DGPs%20and%20CP%20Delhi%20for%20ensuring%20lockdown%20measures%20during%20festival.pdf.
25. https://kerala.gov.in/documents/10180/172d9bbc-b89d-4a36-bbf6f3a61221d75.
26. https://health.deloigovt.nic.in/wps/wcm/connect/defa86804da4c3bb5b867f7982ee7a5c7/lock.pdf?MOD=AJPERES&lnmdeo48689189&CACHEID=defa86804da4c3bb5b867f7982ee7a5c7.
27. https://wb.gov.in/COVID-19/LD8.pdf.
28. https://health.deloigovt.nic.in/wps/wcm/connect/defa86804da4c3bb5b867f7982ee7a5c7/lock.pdf?
29. https://mha.gov.in/sites/default/files/PR_TablighactivitiesinIndia_31032020.pdf.
30. https://timesofindia.indiatimes.com/india/coronavirus-cases-in-india-over-1000-tablighi-jamaat-members-infected-account-for-30-of-all-india-cases/articleshow/74988433.cms.
31. Cyranoski D. What China's coronavirus response can teach the rest of the world. Nature 2020;579:479-80.