

# Covid-19: Impact of Lockdown and Comparative Study in Top Infected Countries in Asian, European and American Continent

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**ABSTRACT:** Aim of the present study is to analyze the importance of lockdown special reference to India and compared COVID-19 confirmed cases as well as the death rate in the top 10 COVID-19 affected countries. Regression coefficient was 0.84, 0.76, 0.51, 0.84 in Lockdown 1, 2, 3, 4 respectively in India. Lockdown-I showed linear regression which was quite good and confirmed cases did not gradually increase. The number of case in Lockdown-2, Lockdown-3, and Lockdown-4 were increased by 286, 172 and 180% respectively as compared to the previous lockdown. Lockdown 4 has more relaxation therefore the number of cases was more than sum of the confirmed cases in lockdown 1, 2, and 3. The regression coefficient ( $r^2$ ) of the trendline was 0.86. At present, the highest death rate was observed in France. The death rate per 1000 confirmed cases are in the United States (58), Brazil (58), Russia (11), Spain (95), United Kingdom (141), Italy (143), France (153), Germany (47), India (29), and Turkey (28). On 25-03-2020, India and Russia have the near equal number of confirmed cases but now, Russia has 214748 more confirmed cases as compared to India, This can be due to proper lockdown in India. Now the number of COVID-19 cases is increasing in India and relaxation in a lockdown may boost up the number of COVID-19 cases. The number of COVID-19 cases in India may be worst in June 2020. All data confirmed that Lockdown would be a crucial role in controlling of COVID-19 disease.

**KEYWORDS:** COVID-19, SAR-Cov-2, death rate, Lockdown

## I. INTRODUCTION

COVID-19 disease crisis was the outbreak of ongoing viral pneumonia in the city of Wuhan, China in 2019. Now, this disease spreads worldwide and more than 368000 deaths occur till date. The severe acute respiratory syndrome coronavirus 2 or SARS-CoV-2 is responsible for COVID-19 disease. SARS-CoV-2 have enveloped positive-sense RNA viruses, are characterized by club-like spikes that project from their surface, an unusually large RNA genome, and a unique replication strategy [1].

SARS-CoV-2 is an enveloped virus with an outer lipid envelope, which makes it more susceptible to disinfectants compared to non-enveloped viruses such as rotavirus, norovirus, and poliovirus [2-3]. The virus that causes COVID-19 is transmitted mainly through close contact and respiratory droplets, with the possible airborne transmission in settings where procedures that can generate aerosol are performed<sup>2,4</sup>, fomites and contaminated surfaces [2,5].

In healthcare settings, environmental surfaces include the surfaces of furniture and other fixed items (e.g. tables, chairs, walls, light switches, computer peripherals) as well as the surfaces of non-critical medical equipment (equipment that only comes into contact with intact skin, such as blood pressure cuffs, wheelchairs, incubators) [2,6]. Most common disinfectants used which have been demonstrated to be effective against SARS-CoV-2 are ethanol 70-90%; chlorine-based products (e.g., hypochlorite) at 0.1% (1000 ppm) for general environmental disinfection or 0.5% (5000 ppm) for blood and body fluids large spills; or hydrogen peroxide >0.5% [2,6,7]. The minimal time recommended of exposition to the surface for these disinfectants is one minute (1) or according to the manufacturer instructions.

On 30-01-2020, India has reported its first COVID-19 confirmed case in Kerala and the patient was studying in Wuhan University, China and had recently returned to India [8]. WHO classified Covid-19 disease transmission into three types on the basis of the development of symptoms of the disease. Symptomatic transmission “a case who has developed signs and symptoms compatible with COVID-19 virus infection”, Pre-symptomatic transmission “the incubation period for COVID-19, which is the time between exposure to the virus (becoming infected) and symptom onset is on average 5-6 days, however, can be up to 14 days” and Asymptomatic transmission “transmission of the virus from a person, who does not develop symptoms” [9]. A Lockdown is a guideline or instructions for people “not to move anywhere” due to specific risks or under pandemic conditions. Govt of India play important card “Lockdown”. The Prime minister of India announced on 24-03-2020 about 1<sup>st</sup> Lockdown due to pandemic COVID-19 disease from 25



March 2020 to 14 April 2020. Lockdown 2, 3 and 4th started from 15 April, 4 May and 18 May 2020 respectively [10-11]. This lockdown in countries provides more time to search an alternative solution for control of COVID-19 disease [12].

Further, Government of India launched Aarogya Setu (mobile) application which provides information of the infected person. Such advanced technology is being used for monitoring the movement of citizens under lockdown order for controlling the deadly COVID-19 [13]. In India, the number of cases, death rates are increased but the condition is under control and the reason behind it may be lockdown [12-13].

II. MATERIAL AND METHODS

Collection of data: COVID-19 confirmed cases and the number of deaths are collected [14] and Lockdown data is selected for the present study [15].

Parameters used in the study: Three parameters such as COVID-19 confirmed cases, number of deaths, deaths rate per 1000 confirmed cases are used in the present study.

Analysis of the impact of lockdown in India: Data of Lockdown-I, II, III, and IV in India was used for comparison with other 09 countries.

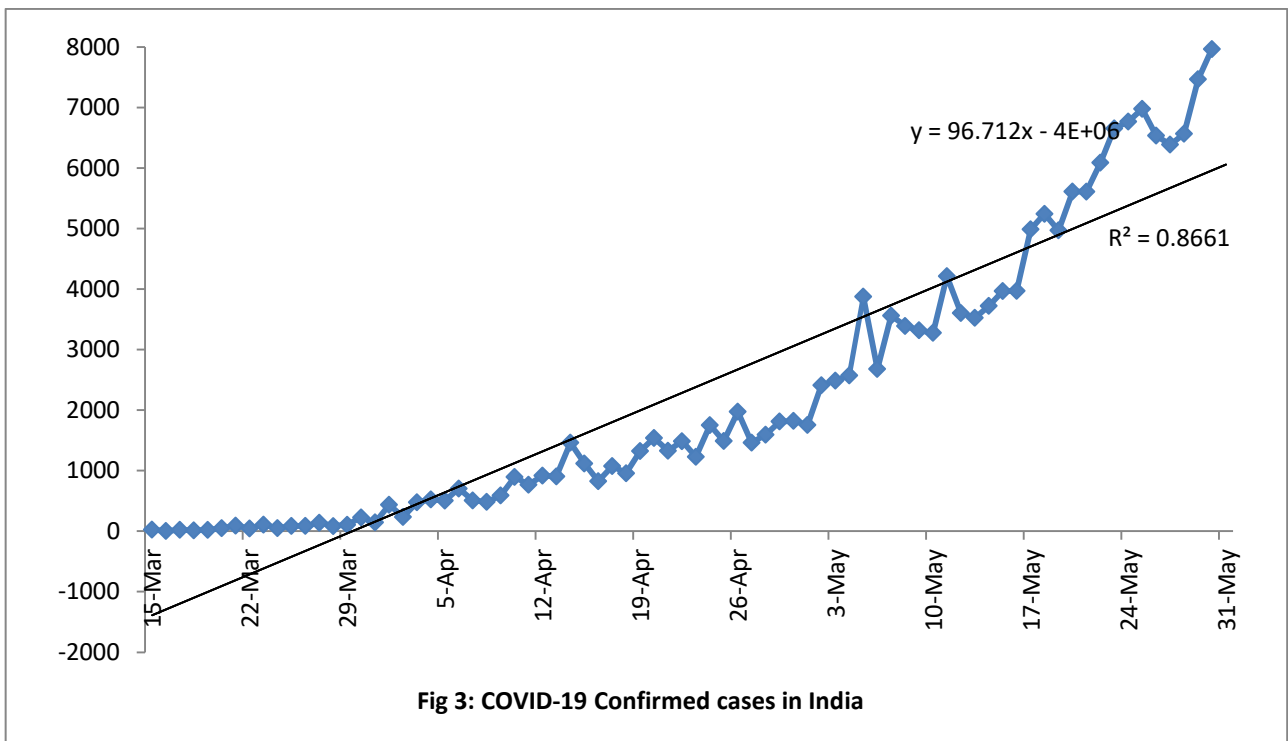
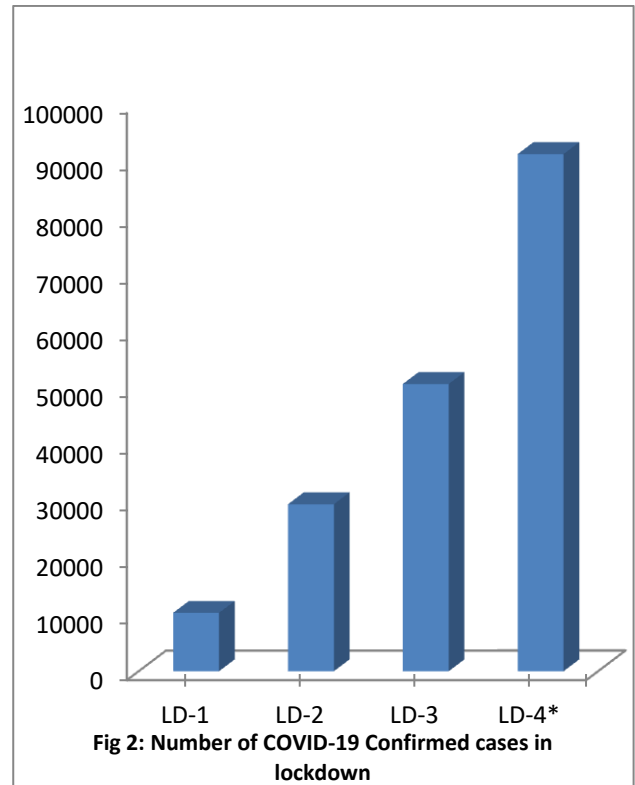
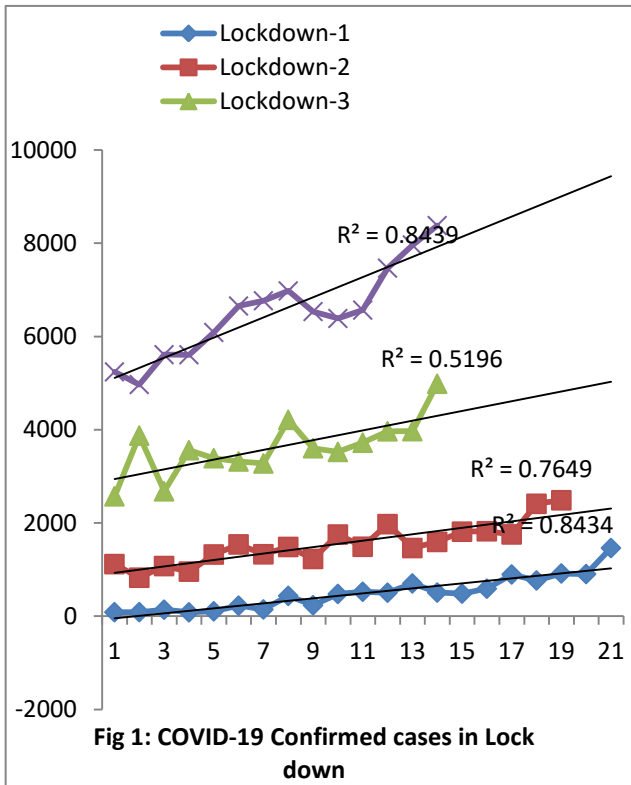
III. RESULTS AND DISCUSSION

R<sup>2</sup> (Regression coefficient) was 0.84, 0.76, 0.51, 0.84 in Lockdown 1, 2, 3, 4 respectively in India. Lockdown-I showed linear regression which was quite good and confirmed cases did not gradually increase. R<sup>2</sup> (Regression coefficient) was changing from lockdown 2 to 4 (Fig 1). The number of case in Lockdown-2, Lockdown-3, Lockdown-4 was increased by 286, 492, 886% respectively as compared to Lockdown-1. Another word, number of cases in Lockdown-2, Lockdown-3, Lockdown-4 were increased by 286, 172, 180% respectively as compared to previous lockdown (Fig 2). Number of the COVID-19 disease cases in India was only 26 on dated 15-03-2020. On 24-03-2020, the number of cases was near 500. Lockdown 3 and 4<sup>th</sup> number of cases were boosted up more rapidly. The trendline of COVID-19 disease was prepared on available daily data. Trendline of COVID-19 disease marginally higher on 05-05-2020 and 17-05-2020, that point the numbers of confirmed cases were 3875 and 4987 respectively. After 17/05/2020, the number of COVID-19 cases was higher than the trendline. Regression coefficient (r<sup>2</sup>) of the trendline was 0.86 (Fig 3). At present, the highest death rate was 153 in France. The death rate in the United Kingdom and Italy were 141 and 143 respectively. The death rate in Russia was 11 which were lowest among in top 10 affected countries. On 25-03-2020, India and Russia have a near equal number of confirmed cases but now, Russia has 218% more confirmed cases as compared to India (Table 1).

Table 1: Number of COVID-19 confirmed cases and death in Top 10 affected countries

S.N	COUNTRY	25-Mar-20		15-Apr-20		04-May-20		18-May-20		30-May-20	
		C*	D*	C*	D*	C*	D*	C*	D*	C*	D*
1	UNITED STATES	86,379	1260	652,474	32,172	1,212,835	69,921	1,550,294	91,981	1,816,820	105,557
2	BRAZIL	2,554	59	28,610	1,757	108,266	7,343	255,368	16,853	498,440	28,834
3	RUSSIA	658	3	24,490	198	145,268	1,356	290,678	2,722	396,575	4,555
4	SPAIN	49515	3,647	180,659	18,812	248,301	25,428	278,188	27,709	286,308	27,125
5	UNITED KINGDOM	9,529	694	98,476	14,915	190,584	28,734	246,406	34,796	272,826	38,376
6	ITALY	74,386	7,503	165,155	21,645	211,938	29,079	225,886	32,007	232,664	33,340
7	FRANCE	25,233	1,331	133,644	17,167	169,462	25,201	179,927	28,239	188,625	28,771
8	GERMANY	37,323	206	134,753	3,804	166,152	6,993	177,289	8,123	183,294	8,600
9	INDIA	657	12	12,370	422	46,437	1,566	100,328	3,156	181,827	5,185
10	TURKEY	2,433	59	69,392	1,518	127,659	3,461	148,067	4,171	163,103	4,515

\*C= Confirmed case, \*D=Death



In India, lockdown-4 has higher COVID-19 confirmed cases as compared to sum of lockdown 1, 2, and 3. The present study confirmed that Lockdown 1, 2, 3, and 4 save approx 2,15,000 confirmed COVID-19 cases (if compared with Russia). India, Lockdown 4 has more COVID-19 cases, the reason may be more relaxation in lockdown and many persons were migrating from one state to another. Lockdown data confirmed that more relaxation in lockdown than more number of cases. Previous study confirmed that when numbers of cases are increasing continuously then lockdown can be play a major role to control COVID-19 disease [1].

## IV. CONCLUSION

Lockdown is the best choice for spreading communicable diseases like COVID-19. Lockdown stopped people to migrate anywhere. Therefore, COVID-19 disease multiplies in specific place and after the detection of disease, it can be controlled. The key feature of Lockdown 4 was transport persons from one place to another and the resulting number of cases in India was jumped 180% from Lockdown 3. All these data confirmed that more relaxation in lockdown will increase the number of confirmed cases. At present, the death rate of COVID-19 disease was the range from 11 to 153 per 1000 confirmed case in world wide. Now the number of COVID-19 cases is increasing in India and relaxation in a lockdown may boost up the number of COVID-19 cases. The number of COVID-19 cases in India may be worst in June 2020. All data confirmed that Lockdown would be a crucial role in controlling of COVID-19 disease. The author advised obeying the instruction given by WHO and Government because at present no proper treatment of COVID-19 disease is available.

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