Comparison of State Case Fatality and Recovery Rates of COVID-19/SARS-COV-2 in India : As of 14th April, 2020

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Abstract:

Background: The present study was carried out to examine the case fatality rate (CFR) and recovery rate (RR) during the pandemic of COVID-19 in the states of India as of 14th April, 2020 as these are important figures during epidemics and pandemics.

Methods: The data were obtained from accurate databases including Ministry of Health and family welfare (MoHFW) and World Health Organization (WHO). A comparison of CFR and RR between states with total cases [?] 100 was made as of14^{th} of April, 2020.

Results: India's CFR was reported to be 3.26% as of April 14, 2020 and it seem to be less in comparison to some European and Asian countries. Interstate CFR comparison reveals that the Madhya Pradesh's CFR was the highest of all the states (7.11) compared with India's CFR and Kerala's RR was highest (52.2%) compared with the India's RR (10.99%).

Conclusion: In India especially in states with the high CFR's, strategies must be employed to ensure that high-risk groups, such as old age, children and people underlying diseases such as diabetes and cancer, receive adequate protection from COVID-19. In addition, case studies with detailed and accurate medical history, and scoring CFR alongside RR, should be adopted in hospitals which may be helpful in exactly pointing the hotspots of infection. These, strategies may help in early detection of COVID-19 followed by access to medical care, which enhances the chances of recovery rates from COVID -19.

Key words: COVID-19, CFR, RR, SARS-CoV-2, Pandemic, India, States

Introduction:

Coronavirus disease 2019 (COVID-19) is the third coronavirus infection in two decades that was originally originated from city of Wuhan, China[1]. It is caused by Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a highly contagious virus that has spread rapidly and efficiently and has presented an unprecedented challenge before the world. As COVID-19 spreads across the world very rapidly since its first emergence in china, at present SARS-CoV-2 enclasps 206 countries world-wide and it's becoming the tragedy of the century. This infection is transmitted by inhalation or

Thus, given the importance of CFR, in this current study the CFR and Recovery rates (RR) of different states of India during a COVID-19 ongoing pandemic was observed using up-to-date state level data.

Methods:

Source of data and procedure: The data were retrieved from accurate databases including Ministry of Health and family welfare (MoHFW), Centre for Evidence Based Medicine (CEBM) and World Health Organization (WHO). Due to the rapid increase in data, the analysis in this study was performed on the 14th of April, 2020 i.e. the day on which first 21 days lockdown ends

Parameters used in study: For this study raw data was mapped according to states and CFR, RR were compared for states with [?] 100 cases. Parameters such as COVID-19 total confirmed cases, total number of deaths, total active cases and total recovered cases were presented.

Measuring the CFR and RR[14]**:**

The formulas below were used to measure CFR and RR

CFR (%) = (Number of deaths due to COVID-19/ Number of reported cases of COVID-19) ×100

RR (%) = (Number of cases recovered from COVID-19/ Number of reported cases of COVID-19) ×100

Results:

The comparison of case fatality rate (CFR), and recovery rates (RR) between different states as of 14th April, 2020 has been presented in Table no.01 and the same is depicted visually in Figure no.01. As of April 14, 2020 total no. of confirmed cases in India was 10,541 and 358 deaths was reported with CFR 3.26%. The total number of exact people infected with COVID-19 may be higher than the number of known confirmed cases, mainly due to limited testing and asymptomatic cases. The geographical spread of coronavirus outbreak in India has now extended to 31 states and Union Territories with Tripura and Nagaland being the latest to report Covid-19 cases. The total number of confirmed cases of COVID-19 was highest in Maharashtra, followed by Delhi and TamilNadu on 14th April, 2020. However, Madhya Pradesh's CFR was the highest on 14th April, i.e.7.11% and greater than the CFR of India i.e. 3.26%. The data showed that five states (Gujarat, Madhya Pradesh, Punjab, Maharashtra, and West Bengal) have CFR greater than the India's CFR. The highest RR was observed in Kerala with RR values of 52.2% compared with the overall India RR of 10.99%. Once again, five states (Kerala, Karnataka, Haryana, Telangana and West Bengal) were found to have greater RR than the India's RR of 10.99%. Coincidentally Kerala was found to have smallest CFR (0.79) and highest RR (52.2) (Figure 1)

Table 01: The comparison of case fatality rate (CFR), and recovery rates (RR) between different states (n =-15-).

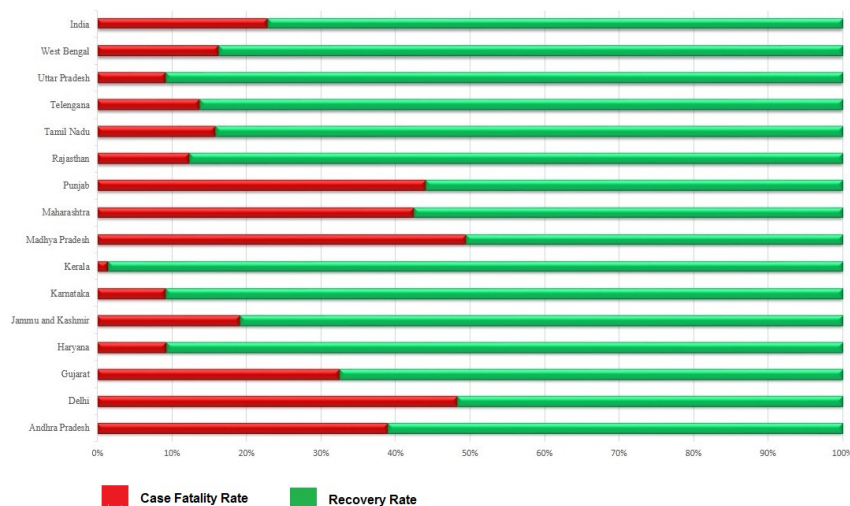| S. No.	State	Total cases	Total deaths	Active cases	Total recovered	CFR (%)	RR (%
1	Andhra Pradesh	432	7	414	11	1.62	2.54
2	Delhi	1510	28	1452	30	1.85	1.98
3	Gujarat	539	26	459	54	4.82	10.01
4	Haryana	185	03	153	29	1.62	15.67
5	Jammu and Kashmir	270	04	250	16	1.4	5.92
6	Karnataka	247	06	182	59	2.42	23.8
7	Kerala	379	03	178	198	0.79	52.2
8	Madhya Pradesh	604	43	517	44	7.11	7.28
9	Maharashtra	2334	160	1957	217	6.85	9.29
10	Punjab	167	11	142	14	6.58	8.38
11	Rajasthan	873	03	849	21	0.34	2.40
12	Tamilnadu	1173	11	1104	58	0.93	4.94
13	Telangana	562	16	446	100	2.84	17.79
14	Uttar Pradesh	558	05	504	49	0.89	8.78
15	West Bengal	190	07	143	36	3.68	18.94
India	10814		353	9272	1189	3.26	

Figure no: 01 The comparison of case fatality rate (CFR) and recovery rate (RR) between different states of India on 14th April, 2020 ($n = 15$).

Discussion:

udy supports the fact that the current CFR of the COVID-19 pandemic in India (3.26) seems to be less than SARS (10%), and MERS (36%)[14]. Also except five states, all the other states in India were found to have CFR less than the CFR of India but many factors may confuse the current estimation for CFR of COVID-19 in Indian states, namely, low case testing, asymptomatic cases, undetected cases or delayed case reporting, which can significantly affect the 2 indicators which are linked with a degree of preparedness and mitigation of both the general public and government. Moreover, enhancing the testing capacity in larger states like Uttar Pradesh, Madhya Pradesh, Rajasthan and West Bengal may give the more positive cases and it may change the CFR scenario also. Study also shows that RR of COVID 19 in some states is on high end compared to India (10.99%) hinting the strength of clinicians in the management of this disease with the available medications advised by Indian council of Medical Research (ICMR). However, limited infrastructure and health care facilities available in India for the 1.3 billion populations (approx.) pose a challenge for the government authorities in containing this disease. Apart from this, certain factors like vastly densely populated slums, illiteracy, poverty and poor sanitization etc., may promote the spread of the disease in India. Thus, the Indian government has adopted the strategy of country wide lockdown starting from March 25th 2020 up to 14th April, 2020 and extended now up to 03rd May, 2020. This decision may have been taken in view of the, absence of a safe and effective vaccine or medicine, reducing viral transmission in the current stage. Further lockdown may provide more time to identify the asymptomatic cases and prevent the community transmission in state level. Along with lockdown strategy, promotion of public awareness, avoidance of public transport, self-quarantine, and use of preventive appliances i.e. face mask, hand hygiene etc. can effectively mitigate the spread of this highly infectious viral disease in India.

Conclusion: Initial findings from reports of China CDC on COVID 19 pandemic conclude that the COVID-19 severity and death is associated with age and comorbidities. oups, such as old age, children and people underlying diseases such as diabetes and cancer, receive adequate protection from COVID-19. should be adopted in hospitals which may be helpful in exactly pointing the hotspots of infection. This will in turn help the government authorities in identifying the areas with higher infection rates, so that lockdown can be strictly carried out in that parts of the country and necessary medical resources will be mobilized to that areas.

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Conflicts of interest

The authors have none to declare.

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