

COVID-19 in Rajasthan: Status and Effects of Containment Measures

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ABSTRACT

Background and Objectives: Presently world is facing Corona virus disease pandemic. This disease was first identified in Wuhan city of China which spread rapidly to more than 200 countries including India. Rajasthan is a state affected badly with this disease. So this present study was conducted to find out the status of COVID-19 in state and to find out the effects of containment measures taken. **Materials and Methods:** This record base case series type of study was conducted from reports received of confirmed COVID-19 cases and reported to the IDSP, DMHS from March 2nd 2020 to May 25th 2020, from various reporting units of Rajasthan. Desired information's were collected, compiled and analyzed. **Interpretation and Conclusion:** There were 7351 laboratory-confirmed case including 4061 recovered cases and 166 deaths. Recovery rate and Case Fatality Rate were found 55.24% and 2.26% respectively. (2.4%) reported. Although patients of all ages were affected with this disease but majority (81.99%) were in 16-60 years of age group. In these positive cases male predominance was also observed with M:F ratio 2.11. Majority of district of Rajasthan were affected with this pandemic having about half of cases in three districts v.i.z. in Jaipur, Jodhpur and Udaipur districts. Average Doubling time has increased from 4 days to 18 days as a result of containment measures undertaken in Rajasthan. So these containment measures like social distancing, masking, washing hand frequently etc. Should be taken care of even after lockdown to prevent the COVID-19 infection.

Key words: COVID-19, PHEIC, SARS CoV-2, Lockdown, Containment Measures, Effect of Lockdown.

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INTRODUCTION

On 12th December 2019, cases of pneumonia of unknown cause were identified in Wuhan, Hubei Province of China. On 31 December 2019, the WHO China Country Office was informed of cases of pneumonia of unknown etiology (unknown cause) detected in Wuhan City, Hubei Province of China.¹ On 07.01.20 causative agent of this disease was identified as severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2).²

On 13 January 20, first time a COVID-19 case was identified outside China in Thailand.¹ On 30th January 20 there were 9700 cases worldwide spreading in 21 countries including India. WHO declared it as Public Health Emergency of International concern (PHEIC) on 30th January 2020.¹ On 11th March 20, WHO officials declared its a pandemic with 118,000 cases and 4,291 death spread over to 114 countries.¹

First case of COVID-19 was reported in India on 30th January 20 who was a student came from China³ and first confirmed cases on 2nd March 20 in Jaipur a Italian tourist.⁴ As of 9 July 2020, there were 767,296 cases and 21,129 deaths in the country being highest number of cases in Asia⁵ and third highest number

of confirmed cases in the world after United States and Brazil.⁵

With the emergence of COVID case in Bundi on 28th May 20, 33 districts of Rajasthan are affected with this epidemic.⁶ As per Ministry of Health and Welfare Government of India declared that on 10 July 2020, there are 22563 cases and 491 deaths in the Rajasthan being tenth in country.

Rajasthan government has taken multiple measures to combat to the situation along with following the containment measures suggested by Indian Government. So this record based descriptive study was conducted to find out the status of COVID-19 in state along with to find out the effects of preventive measures taken by the government.

MATERIALS AND METHODS

This record based descriptive analytic study was conducted in Directorate of Medical and Health Services (DMHS) in collaboration of Directorate of Medical Education (DME) in year 2020.

For this study all the reports regarding laboratory-confirmed COVID-19 cases were taken since

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starting (2nd March 20) to 25th May 2020. These reports were retrieved from the department of Integrated Disease Surveillance Programmed (IDSP) of DMHS and from DME.

Beside number of cases and information regarding age, sex, residence of positive case, present status of cases was found. Desired information's were collected and compiled in Microsoft Excel 10 workbook sheet. These data were classified presented in the form of tables and charts and analyzed to get inferences.

Steps (main ones) taken by Rajasthan Government to combat the COVID-19 were as follows:-

- After having a meeting on 3rd March 20 with Union Health Ministry after having 2 positive cases positive in Jaipur, the Chief Minister of Rajasthan ordered to sanitize the hotels where the Italian tourists resided.⁶
- On 18 March, after getting three people of a family tested positive for COVID-19 in Jhunjhunu, movement was restricted within 1 km² of their residence.⁶
- On 19th March, the state government imposed Section 144 across the entire state to restricted gathering of five or more.⁷ The government had also screened all passengers reaching Jaipur via foreign flights and kept the ones showing symptoms in home isolation for 14 days.⁶
- On 20th March after getting cases in Bhilwara, the government imposed a curfew on the whole district and sealed its borders. Door-to-door survey of around 80,000 houses in the Bhilwara city was initiated.⁶
- On 22nd March, the state was first to announce complete lockdown starting 22 March, barring essential services.⁶
- On 22 March, it banned public transport services in the state.⁶
- Rajasthan also followed the India's launch of a 14 hr voluntary 'Janta Curfew' and immediately after that on 22nd March 2020 for 21 days which was extended upto 30th May 2020 in two phases. After that now unlocking process has started from 1st June 2020 with the opening of religious places, hotels, restaurants and other hospitality services, shopping malls from 8th June 20 in its first phase. With this unlocking public became reluctant to go full-on into the pre-lockdown life.⁸⁻¹²
- On 24 March, the state banned all private vehicles in the roads after COVID-19 cases crossed 32 in the state.⁶ The state government had also announced free ration for two months for families covered under the National Food Security Act (NFSA).⁶
- On 26 March, after getting a positive case in Ramganj, Ramganj was put under a curfew as it became a new hotspot in the state. Door-to-door screening was started.⁶
- On 18 May, Rajasthan government issued guidelines for relaxations like movement of individuals were restricted from 7 pm to 7 am for non-essential activities, all shops including malls except those in containment zones were allowed to open, with conditions of social distancing and only two to five customers allowed at a time.⁶

Monitoring and supervision of containment measures

Thirty three districts of state were divided into 7 zones administratively so for each district and zone respectively nodal officer for COVID-19 was designated who is responsible for monitoring and supervising anti-COVID-19 activities of district. At State and district level War rooms were constituted for prevention, containment and management of COVID -19 through a graded, pre-emptive and proactive approach. These are being regularly reviewed and monitored at the highest level.

To find out the effects of containment measures specially of lockdown, the whole period was divided into:

1. Before Lockdown (before 25.03.2020)
2. Lockdown 1.0 (Between 25.03.2020 to 14.04.2020)
3. Lockdown 2.0 (Between 14.04.2020 to 03.05.2020)
4. Lockdown 3.0 (Between 03.05.2020 to 17.05.2020)
5. Lockdown 4.0 (Between 17.05.2020 to 25.05.2020) (although this lockdown was continue till 31.05.2020 but study was conducted upto 25.05.2020 only)

All the variables like case fatality rate, doubling time of cases etc were analyzed as per these above periods and compared to find out the effect of lockdown.

Statistical Analysis

Qualitative data were expressed in percentage and proportions and quantitative data were expressed in mean and standard deviation. Epidemic curves was constructed with date wise data available. Growth rate, Doubling Time, Case fatality rate etc for COVID-19 were also calculated.

RESULTS

By 25th May 2020, total 7351 cases were found COVID-19 positive in Rajasthan. Out of these 7351 cases, 4061 were recovered and 166 cases were died due to COVID-19; calculating recovery rate 55.24% and case fatality rate 2.26%. (Figure 1)

As per sex wise distribution of cases, majority (67.9%) of cases were male having M:F ratio 2.11 and majority were in age group 16-30 years (38.06%) followed by 31-45 years (27.71%), 46-60 years (16.22%), less than 16 years (10.6%) and more than 60 years age group (7.41%). People who move outside house 16-60 years were 81.99%. (Figure 2 and 3)

When district wise distribution of cases were analyzed, it was found that maximum cases were in Jaipur (1807 i.e. 24.58%) followed by Jodhpur (1213 i.e. 16.5%), Udaipur (499 i.e. 6.9%), Nagaur (404 i.e. 5.5%), Kota (387 i.e. 5.26%), Pali (349 i.e. 4.75%) etc. (Figure 4)

Epidemic curve was constructed of these 7351 cases, cases were increasing with the time. More than 100 case per day first time came on 11.04.2020, 200 cases crossed on 13.05.2020 and cases crossed over 300 on 24th May 2020. That shows its faster growth with time, which was better depicted in Table 1 and Figure 5.

Status of COVID-19 cases as per status of lockdown were observed to found the effect of lockdowns. It was observed that although the number of cases were regularly increasing with the time but doubling time of cases has increased from 4 days to 18 days in 3rd lockdown which again become 17 days in 4th lockdown. Likewise average growth rate also

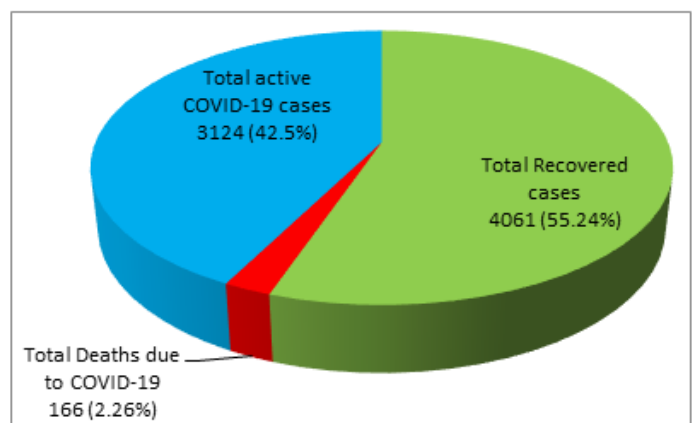


Figure 1: Status of COVID-19 cases as on 25th May 2020 (N=7351).

Table 1: Status of COVID-19 cases as per status of lockdown.

Variables	Before Lockdown (24.03.2020)	2 nd Lockdown 15.04.2020 to 03.05.2020	2 nd Lockdown 15.04.2020 to 03.05.2020	3 rd Lockdown 03-17.05.2020	4 th Lockdown 18-25.05.2020
Average New Positive/Day	9	69.67	104.05	161.43	258.63
Total Cases Till Date	52	1045	3022	5282	7351
Increase in cases	52	993	1977	2260	2069
Total recovered Till date	0	214	1663	3103	4061
Increase in Recovered cases	0	214	1449	1440	958
Total Death Till date	1	10	77	132	166
Increase in deaths	1	9	67	55	34
Average Recovery Rate	0	16.00	35.00	58.00	57.30
Average Death Rate	1.92	1.50	1.70	2.70	2.40
Average Growth Rate	24.3	17.30	5.80	4.10	4.20
Doubling time	4	6	10	18	17

Table 2: Comparison of variables related to status of COVID-19 as per status of lockdown.

Variables	Average Recovery Rate	Average Death Rate	Average Growth Rate	Doubling Time
Before Lockdown (24.03.2020)	0	1.9	24.3	4
First Lockdown 25.03.20 to 14.04.2020	16	1.5	17.3	6
2 nd Lockdown 15.04.2020 to 03.05.2020	35	1.7	5.8	10
3 rd Lockdown 03-17.05.2020	58	2.7	4.1	18
4 th Lockdown 18-25.05.2020	57.3	2.4	4.2	17
P Value (LS)	<0.001 (S)	0.037 (S)	<0.001 (S)	<0.001 (S)

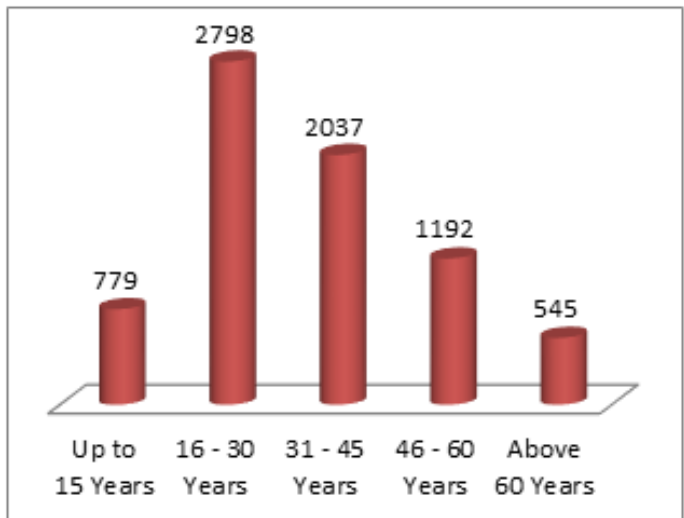


Figure 3: Age wise distribution of cases (N=7351)

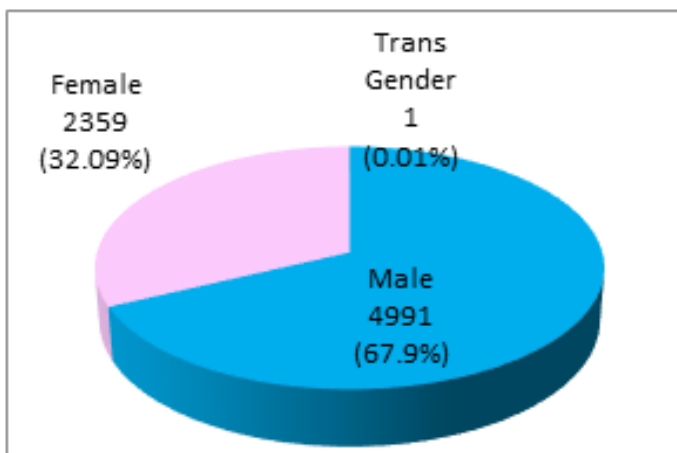


Figure 2: Sex wise distribution of cases (N=7351).



Figure 4: District wise distribution of COVID-19 cases (N=7351).

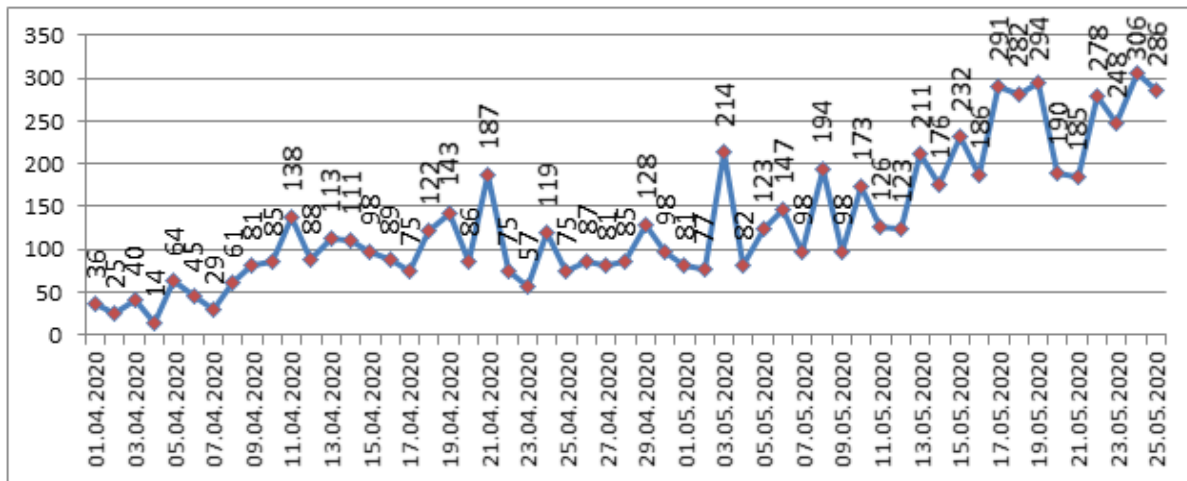


Figure 5: Date wise new nCovid cases (N=7351). (before 1st April 115 cases).

decreased 24.3% to 4.1% in 3rd lockdown which again become 4.2% in 4th lockdown. Although average death rate is increasing with time and ranges from 1.95 to 2.7% but average recovery rate also has significantly increased from baseline (before lockdown); it increases from 0% to 58% till 3rd lockdown which again start decreasing and become 57%. (Table 1 and 2).

DISCUSSION

In this present study, on 25th May 2020, there were 7351 laboratory-confirmed case including 4061 recovered cases and 166 deaths calculating Recovery rate (RR) 55.24% and Case Fatality Rate (CFR) 2.26%. Case fatality rate was found lesser than that of reported by other authors.¹³⁻²⁰ whether in-house or in other countries. Most of studies were conducted in China like Wu Z *et al.*¹³ reported case fatality rate 2.3% with 14.8% in the above 80 years population in China. Other study conducted by Chen N *et al.*¹⁴ in Wuhan city of China reported CFR 2.5% and 8.0% of population in the 70–79 years. Another study conducted by Tuo Ji *et al.*¹⁵ in Huangshi city of C found CFR 3.74%. Even in Italy the CFR is reported more than the present study.¹⁶ Studies¹⁷⁻²⁰ conducted in India are very few but they have also reported CFR more than the present study. Basu D *et al.*¹⁷ found CFR 3.5% in their study. Mazumder A *et al.*¹⁸ conducted a study on 1161 COVID patients and reported that 29 deaths and 94 patients recovered cases calculating CFR 2.5% and Recovery rate 8.1%. This recovery rate was also significantly lower than the present study (8.1% v/s 55.24%). This lowered CFR and higher RR in present study be because of betterment of medical facilities and better understanding of epidemiology of COVID-19 disease virus.

In the present study, although patients of all ages were affected with this disease but majority (81.99%) were in 16-60 years of age group. In these positive cases male predominance was also observed with M:F ratio 2.11 in present study. Other studies of India and other countries also reported almost similar observations regarding age and sex affected due to this disease. Mazumder A *et al.*¹⁸ reported median age 38 years with M:F ratio 2.78 and 20-39 year-old males being the most affected group. Gupta N *et al.*¹⁹ reported median age 54 years with interquartile range: 44-63 and M:F ratio of 4. Tuo Ji *et al.*¹⁵ reported age range 1 month to 92 years and M:F ratio 1.1 and maximum cases (79.11%) in age group of 18-64 years. Studies conducted in Wuhan, China^{14,21,22} cohorts of Wuhan, the median age of affected patients ranges from 49–56 years.

In present study effect of lockdown was clearly observed by significant increase in doubling time and decrease in growth rate. Doubling time

of cases has increased from 4 days to 18 days in 3rd lockdown which again become 17 days in 4th lockdown. Likewise average growth rate also decreased 24.3% to 4.1% in 3rd lockdown which again become 4.2% in 4th lockdown. Studies in India and abroad also reported positive impact of lockdown as in this present study. Basu D *et al.*¹⁷ observed that doubling time has increased from about 5 days to over 10 days at the middle of May 20. Arun Mitra *et al.*²³ Gupta N *et al.*¹⁹ Gupta M *et al.*²⁰ also reported increase in doubling time after lockdown and concluded that it is much-needed effort to delay the peak flatten the epidemic-curve. Similar observations were from foreign authors.^{15,24,25}

CONCLUSION

All the age are susceptible for COVID-19 with M:F ratio 2.11. Majority (81.99%) of cases were in 16-60 years of age, who move outside. Majority of district of Rajasthan were affected with this pandemic having about half of cases in three districts viz in Jaipur, Jodhpur and Udaipur districts. Case Fatality Rate was found 2.26% and Recovery rate was found 55.24%. Average Doubling time has increased from 4 days to 18 days as a result of containment measures undertaken in Rajasthan. So these containment measures like social distancing, masking, washing hand frequently etc. should be taken care of even after lockdown to prevent the COVID-19 infection.

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CONFLICT OF INTEREST

The authors declare no Conflict of interest.

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