

CORONA VIRUS, HEALTH INFRASTRUCTURE AND ECONOMIC GROWTH IN INDIA

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ABSTRACT

Background: The coronavirus outbreak is first and foremost a human tragedy, affecting hundreds of thousands of people. It not only have a growing impact on the global economy but also on our social behaviour. The existing health infrastructure in India is very inadequate for COVID patients. **Objective:** This study seeks to investigate the linkage and impact of paramedical staffs and health infrastructure on the number of corona virus deaths focusing on inter-state variation and to analyse the economic effect of COVID-19 Pandemic on GDP, unemployment, inflation and industrial production. **Methodology:** This study is completely based on secondary data and analysis is based on multi-variate regression model, ANOVA, correlation matrices, graphs and descriptive statistics. **Results:** Corona positive to bed ratio, positive to doctor ratio, positive to nurse ratio and positive to hospital ratio variables are significant in determining corona deaths in India. The Corona death to corona positive ratio does not determine the number of deaths in a good way. There is wide variation in health infrastructure across states in India. **Conclusion:** The waves of Covid-19 has brought the attention of the entire globe towards improvement of health infrastructure and manpower. Improvement in number of hospitals, appointment of more doctors, nurses and other para medical staff can protect people from the risk of Coronavirus. The strict practice of COVID appropriate behaviour is the basic necessity to control the spread of the pandemic.

Keywords: Corona Virus, Doctor, Health Infrastructure, Hospital, Nurse, Pandemic.

1. Introduction

The novel SARS-CoV-2 corona virus that emerged in the city of Wuhan, China has caused a large scale COVID-19 epidemic and spread to more than 213 other countries. Corona viruses are a large family of viruses that can cause illnesses ranging widely in severity. The first known severe illness caused by a corona virus emerged with the 2003 Severe Acute Respiratory Syndrome (SARS) epidemic in China. The second wave has come with more infectious variants which has wreaked chaos with people and healthcare systems across India (Warrier, 2021). The most recently discovered coronavirus causes coronavirus disease COVID-19 which has no proper medicine or vaccine. (V.C.C. Cheng, S-C. Wong, K.K.W. To, P.L. Ho, K-Y. Yuen, 2020). An 'Outbreak of Coronavirus' is a sudden rise in positive cases of a disease in a different countries (C. S. Tarimo, Jian Wu, 2020). It is clear that the coronavirus can be transmitted from human to human (H.Koshle, R.Kaur, R.Basista, 2020). A second outbreak of severe illness began in 2012 in Saudi Arabia with the Middle East Respiratory Syndrome (MERS). Ever since the break out of COVID-

19 virus pandemic, analysts and experts worldwide are in a race to project bigger and bigger economic troubles for the global economy. John, et al. (2021) stated that in both the waves of Covid-19 the elderly people have suffered a lot. With each day passing, the new forecasts are showing a gloomier picture than the previous one. The prospects for the Indian economy, impacted by the first wave has been largely disruptive and projected as diving into new bottoms with time. The prospects for the Indian economy, though impacted by the second wave, remain resilient, backed by the prospects of another bumper rabi crop, the gathering momentum of activity in several sectors of the economy till March, especially housing, road construction, and services activity in construction, freight transportation, and information technology (IT), as per RBI annual report. Almost all the sectors have been adversely affected during second wave of the COVID-19 pandemic, though GDP growth is likely to be below the expected 10 per cent but nothing like the first wave is expected when GDP growth crashed 23.9 per cent. A major concern of the second wave is that the virus has spread into India's hinterland and could wreak havoc in villages. Lockdowns may

help breaking the chain of transmission, however the gap period should be utilized to vaccinate the people which again is a difficult and time consuming job considering diverse social and political culture in India. The coronavirus outbreak is first and foremost a human tragedy, affecting hundreds of thousands of people. Many states imposed curfews and lockdowns which forced all people confined to their residence (Nahata, 2021). It not only have a growing impact on the global economy but also on our social behaviour. The global COVID-19 pandemic has forever changed our experiences, attitudes and behaviours as customers, employees, citizens and humans.

Objective of the Study

There are two objectives of the study as follows.

- (i) To investigate if paramedical staffs and health infrastructure have a significant impact on the number of deaths.
- (ii) To analyse the economic effect of COVID-19 Pandemic on GDP, unemployment, inflation and industrial production.

2. Hypothesis

H₀: There is significant impact of the availability of paramedical staff and health infrastructure on the number of Corona virus deaths in India.

3. Materials and Methods

We have used COVID-19 data available publicly from reports and COVID Dashboards of India and states. The main sources of data are the Ministry of Health and Family Welfare (GoI), COVID-19 India Dashboard, and Wikipedia. Statistical methods like Multivariate Linear Regression analysis, correlation, ANOVA and descriptive statistics are used for results and findings.

4. Linkage between Health Infrastructure and Corona Deaths in India

Health infrastructure and health care expenditure are necessary for reducing deaths in any disease in India. India is criticised in the world due to poor health infrastructure, inadequate number of doctors and paramedical staff. The present study tried to link between corona death and health infrastructure at national level and interstate variation of existing infrastructure of health.

4.1 Corona Virus Deaths and Health Infrastructure

In this model, the dependent variable is the number of deaths and the explanatory variables are death to a positive ratio, positive to bed ratio, positive to doctor ratio, positive to nurse ratio and positive to hospital ratio.

Multivariate Linear Regression Model

$$ND = \beta_0 + \beta_1 DPR + \beta_2 PBR + \beta_3 PDR + \beta_4 PNR + \beta_5 PHR + u \quad \dots \quad Eqn-1$$

$$Observation \ i: ND_i = \beta_0 + \beta_1 DPR_i + \beta_2 PBR_i + \beta_3 PDR_i + \beta_4 PNR_i + \beta_5 PHR_i + u_i \quad Eqn \ 2$$

Here the total number of explanatory variables is five.

Total number of observation = 36 (i=36)

ND_i = No of Deaths for 36 observation

DPR_i = Death to Positive case Ratio for 36 observation

PBR_i = Positive case to Bed Ratio for 36 observation

PDR_i = Positive case to Doctor Ratio for 36 observation

PNR_i = Positive case to Nurse Ratio for 36 observation

PHR_i = Positive case to Hospital Ratio for 36 observation

u = "error" term that embeds all unobserved factors affecting the number of deaths

B₀ = Slope coefficient

B₁ = effect on the number of deaths of a 1-unit increase in Death to Positive case Ratio

B₂ = effect on the number of deaths of a 1-unit increase in Positive case to Bed Ratio

and so on.

Table-1: Multiple Regression Results

Dependent Variable: ND				
Method: Least Squares				
Date: 09/09/21 Time: 19:27				
Sample: 1 36				
Included observations: 36				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3573.462	6302.599	-0.566982	0.5749
DPR	582934.5	387416.9	1.504670	0.1429
PBR	-674.8882	225.8609	-2.988071	0.0056
PDR	97.35522	13.84249	7.033073	0.0000
PNR	-621.9493	162.7970	-3.820398	0.0006
PHR	4.471164	1.844241	2.424392	0.0216
R-squared	0.650373	Mean dependent var		12023.42
Adjusted R-squared	0.592102	S.D. dependent var		23530.49
S.E. of regression	15028.20	Akaike info criterion		22.22426
Sum squared residual	6.78E+09	Schwarz criterion		22.48818
Log-likelihood	-394.0366	Hannan-Quinn criter.		22.31637
F-statistic	11.16115	Durbin-Watson stat		1.992581
Prob(F-statistic)	0.000004			

Source: Computed by Authors using E-views

Estimated Equation

After regression, the estimated regression equation is as follow:

$$ND_i = -3573.46 + 582934.5 DPR_i - 674.89 PBR_i + 97.36 PDR_i - 621.95 PNR_i + 4.47 PHR_i + u_i \dots\dots\dots Eqn- 2$$

Table-1 provides the regression model where the dependent variable, number of corona death cases depends on the independent variables like death to a corona positive ratio, positive case to bed ratio, positive case to doctor ratio, positive case to nurse ratio and positive case to hospital ratio. Regarding statistical significance, out of all five independent variables, the death to positive ratio is not significant as the p-value which is 14 per cent that is more than 5%. Therefore, the corona death to positive ratio is insignificant to determine the dependent variable that is number of corona deaths. However corona positive case to bed ratio (PBR), positive to doctor ratio(PDR), positive to nurse ratio(PNR) and positive to hospital ratio(PHR) are significant here because the p values of all these independent variables are less than 5%. Hence PBR, PDR, PNR, and PHR determine number of corona deaths in good ways because these are significant in this regression model. Regarding the goodness of fit of the regression model, it is obvious that the model is a good one owing to having the value of R-squared

and adjusted R-squared is more than 50%. Since the model is a good fit one, it can be said that all the five independent variables cumulatively explain 65.03% of the dependent variable. Since the adjusted R-squared is 59.21% which signifies that 59 % of the variation in the number of deaths is owing to the Positive COVID case to Bed ratio, positive COVID case to Doctor ratio, positive COVID case to Nurse ratio and positive COVID case to Hospital ratio.

Moreover, the Prob (F-statistic) is significant, which is less than 5% proving that the model is fit. Moreover Prob (F-statistic) is less than 5%, for which all the explanatory variables jointly influence the number of death which is the dependent variable in this model.

Regarding data set having autocorrelation or not, here the Durbin-Watson stat is less than two that is 1.99, which signifies the data set is having positive autocorrelation. Since the guideline suggests if the value of the DW test is less more than two there is negative autocorrelation, if less than two there is positive autocorrelation and if equal to there is no autocorrelation. Since the value of the DW test is approximately two, so there is no autocorrelation in the model. The correlation coefficient among variables are shown in table-2.

Table-2: Correlation Matrix

For determining the type of relationship that two variables are sharing, correlation coefficient among the variables are shown below.

	Y ND	X1 DPR	X2 PBR	X3 PDR	X4 PNR	X5 PHR
Y ND	1.00	0.23	0.07	0.63	-0.07	0.09
X1 DPR	0.23	1.00	0.11	0.09	0.06	0.18
X2 PBR	0.07	0.11	1.00	0.40	0.13	0.42
X3 PDR	0.63	0.09	0.40	1.00	0.35	0.16
X4 PNR	-0.07	0.06	0.13	0.35	1.00	0.50
X5 PHR	0.09	0.18	0.42	0.16	0.50	1.00

Source: Computed by Author

Table-2 represents the correlation among the variables. Here the variable Y which is number of deaths and X₁ that is death to the positive case has the correlation of 0.23, which is a positive but not so strong relationship between these two variables. Similarly, the variables Y and X₂ has the value of 0.07 which is also the same as the relationship of Y and X₁. In the case of Y and X₃, the coefficient is 0.63 showing the moderate positive relationship. It means if the number of deaths increases, the positive to doctor ratio also increases and vice versa. For the variables Y and X₄, the value is

closer to the negative one that is -0.07, which shows that there is inverse relationship between these two. It means the rise in the number of death results fall in positive to nurse ratio and vice versa. In the case of Y and X₅, this is the value closer to zero, which means there is no relationship arises among these two and so on.

Out of all relationship, one more positive relationship arise that is between positive to hospital ratio and positive to nurse ratio. If PHR increase then PNR also increases and vice versa.

Table-3: Two Way ANOVA

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Sample	0	0	65535	65535	0.00576	4.415687
Columns	200.201	5	100.167	8.95671	9.92631E-08	2.257065
Interaction	0	0	65535	3.5535	0.03564	3.1546851
Within	403	210	9283354			
Total	603.201	215				

Source: Computed by Author

Table-3 represents the analysis of variance of samples. Here the f value of the column is 8.96 which are bigger than the f critical value of 2.26. Hence we reject the null hypothesis. This means that the the observation by the column, number of deaths, death to a positive ratio, positive to bed ratio, positive to doctor ratio, positive to nurse ratio and positive to hospital ratio are same. In favour of the alternative hypothesis is that there is a difference between at least two of them. Regarding the interaction point of view, we can see here that f statistics is 3.53 this is greater than the f critical value of 3.15 and this of course is set at $\alpha = 0.05$. Therefore, even though it is merely marginally

higher than a critical value, we must reject the null hypothesis that there is no interaction among all States and UTs in favour of the alternative hypothesis that there is an interaction. We can also see here the p-value is 0.035 is less than the α value of 0.05. So we also reject in that instance.

4.2 Inter-state Analysis of Corona Virus Indicator Ratios

The effect of the corona virus status is different in different States and UTs. The corona virus situation in different states and UTs in April, 2021 is shown below.

Table-4: State-wise COVID ratios in India in April, 2021

State	Number of COVID Deaths	Death to COVID Positive Ratio	COVID Positive to Bed Ratio	COVID Positive to Doctor Ratio	COVID Positive to Nurse Ratio	COVID Positive to Hospital Ratio
A and N Islands	129	0.02	5.44	105.07	41.3	210.14
Andhra Pradesh	13,838	0.01	22.47	393.06	3.6	2166.06
Arunachal Pradesh	260	0.01	18.77	96.47	3.2	222.52
Assam	5,655	0.01	22.66	96.82	1.7	340.58
Bihar	9,405	0.01	21.29	197.52	0.2	232.81
Chandigarh	813	0.01	10.75	461.7	64.6	5007.62
Chhatisgarh	13,188	0.01	52.5	604.98	2.4	2484.1
Dadar Nagar Haveli	4	0.01	9.34	96.41	14.1	524.89
Delhi	25,081	0.02	33.9	157.63	23	8168.95
Goa	3,198	0.02	35.28	333.69	27.8	2674.62
Gujarat	8,385	0.01	9.58	121.96	9.3	474.23
Haryana	9,542	0.01	19.7	292.36	6.2	356.33
Himachal Pradesh	3,579	0.02	12.37	140.63	4.5	205.93
J & K	4,407	0.01	37.84	80.15	1.3	2071.68
Jharkhand	5,132	0.01	12.21	194.01	1.3	255.03
Karnataka	37,290	0.01	10.46	584.15	5.9	275.94
Kerala	20,673	0.01	37.75	768.66	75.5	979.81
Ladakh	51	0.01	2	54.74	3.3	397.88
Lakshadweep	207	0.01	44.87	708.66	31.3	1580.85
Madhya Pradesh	7,328	0.01	7.59	115.34	1.6	545.59
Maharashtra	1,37,098	0.02	25.93	925.45	6.8	2017.03
Manipur	1,781	0.02	59.07	103.46	6.9	2992.16
Meghalaya	1,307	0.02	13.44	129.46	1.1	409.38
Mizoram	212	0.01	21.49	132.04	3.9	510.64
Nagaland	617	0.02	10.91	68.66	5.5	612.31
Odisha	7,954	0.01	36.53	299.82	2.4	402.68
Puducherry	1,812	0.01	22.2	176.37	65.5	6172.85
Punjab	16,373	0.03	9.16	200.73	13.3	258.87
Rajasthan	8,915	0.01	9.52	131.97	1.7	168.99
Sikkim	370	0.01	14.22	111.35	4.3	727.83
Tamil Nadu	34,897	0.01	15.63	360.96	7.6	1070.45
Telangana	3,872	0.01	6.12	159.52	25.2	160.03
Tripura	795	0.01	16.51	65.05	0.5	504.93
UP	22,863	0.01	5.65	158.94	0.5	99.94
Uttarakhand	7,381	0.02	13.38	255.17	1.6	266.06
West Bengal	18,431	0.01	12.68	175.33	1.2	684.04
Descriptive Statistics						
Mean	--	0.01	19.98	251.62	13.06	1284.27
Standard Deviation	--	0.01	13.85	217.89	19.63	1808.08
Range	--	0.02	57.07	870.71	75.30	8069.01
Observations	--	36.00	36.00	36.00	36.00	36.00

Source: MoHFW and COVID Dashboard, Computed by the Author, Descriptive Statistics of absolute number of deaths are not computed.

Table-4 represents the COVID situation state wise in India by April 2021. The situation in all the states is not normal. It is observed that Maharashtra, Gujarat, Delhi, Madhya Pradesh, Uttar Pradesh, Andhra Pradesh and West Bengal are in a little bit dangerous situation. Among the remaining states Punjab, Rajasthan,

Tamil Nadu, Bihar are in a moderate situation, whereas, Haryana, Kerala, J & k, Telangana and Karnataka are in a little bit controlled category. Corona positive to hospital ration has more standard deviation and more interstate variation.

Table- 5: State and UTs wise COVID-19 testing, recovery Cases in India by April 2021

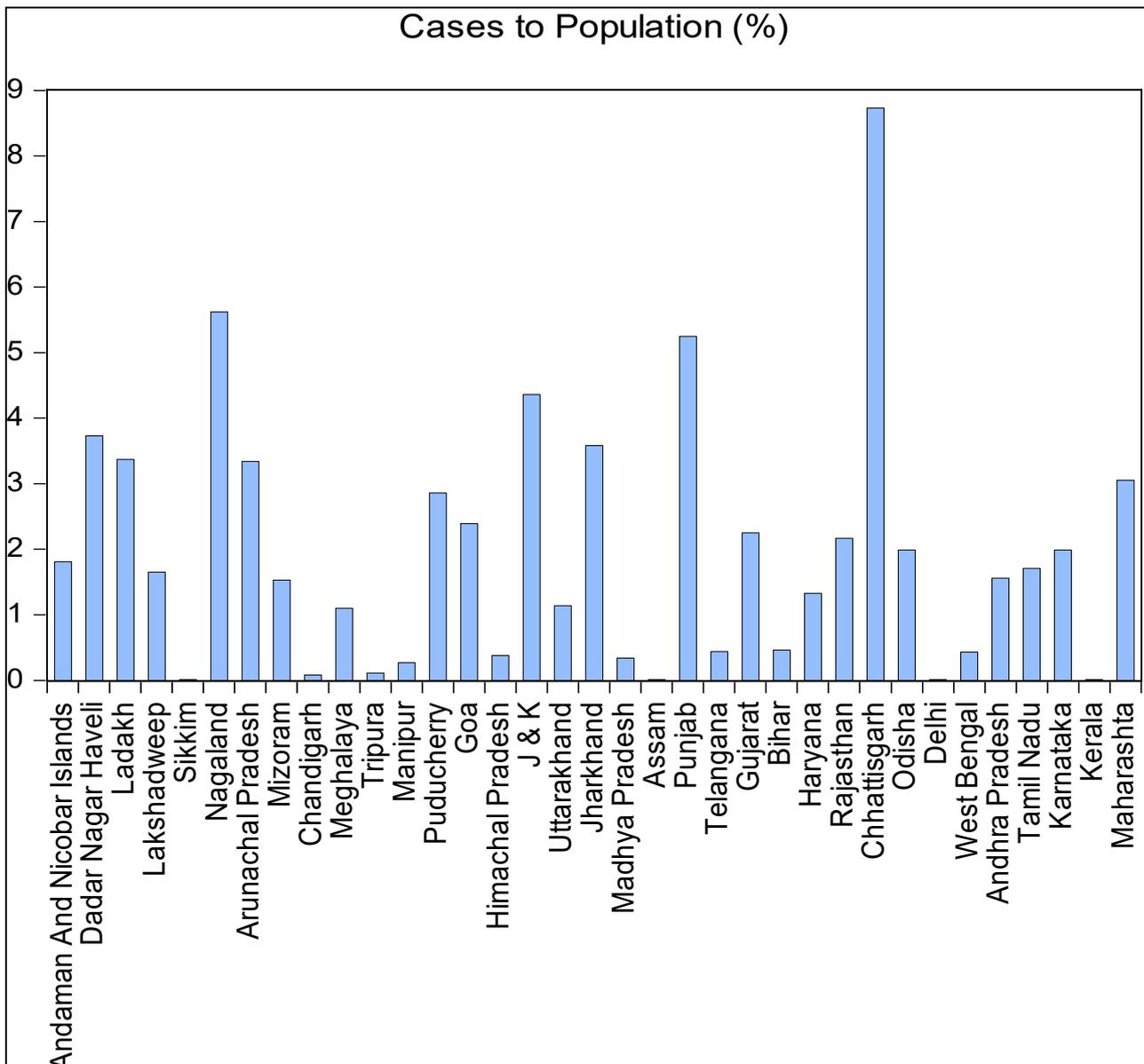
STATES and UTs	COVID Cases to Population (%)	Recovered to Total COVID Case (%)	Testing to Population (%)
A and N Islands	1.81	98.23	13.55
Dadar Nagar Haveli	3.73	98.57	16.95
Ladakh	3.37	97.81	13.49
Lakshadweep	1.65	97.86	20.67
Sikkim	0.01	98.17	0.06
Nagaland	5.62	98.69	44.01
Arunachal Pradesh	3.34	98.61	31.20
Mizoram	1.53	99.57	11.76
Chandigarh	0.08	98.99	75.79
Meghalaya	1.10	96.48	68.50
Tripura	0.11	96.27	0.10
Manipur	0.27	99.77	23.19
Puducherry	2.86	97.54	13.63
Goa	2.39	98.26	46.03
Himachal Pradesh	0.38	96.44	0.09
J & K	4.36	98.11	62.34
Uttarakhand	1.14	97.37	6.45
Jharkhand	3.58	98.79	15.51
Madhya Pradesh	0.34	91.63	2.81
Assam	0.01	80.15	0.06
Punjab	5.25	97.02	21.86
Telangana	0.44	76.12	4.33
Gujarat	2.25	94.96	3.88
Bihar	0.46	80.08	3.98
Haryana	1.33	92.44	5.56
Rajasthan	2.17	98.55	19.75
Chhattisgarh	8.73	97.99	41.59
Odisha	1.99	97.21	33.37
Delhi	0.01	99.75	0.12
West Bengal	0.43	95.31	4.55
Andhra Pradesh	1.56	99.84	33.54
Tamil Nadu	1.71	98.52	42.70
Karnataka	1.99	97.77	15.28
Kerala	0.01	94.89	0.07
Maharashtra	3.05	95.98	38.17
Descriptive Statistics			
Mean	1.97	95.82	21.00
Standard Deviation	1.97	95.82	21.00
Skewness	3.14	6.27	0.51
Kurtosis	1.52	-2.62	1.09
Range	8.72	23.72	75.73
Observations	35	35	35

Source: MoHFW and COVID Dashboard & Authors computation

Table-5 provides the percentage of COVID cases, and the percentage of recovered case state and UTs wise in India by April 2021. Regarding percentage case wise with population, it is visible that MP is having the highest number of percentage cases that is followed by West Bengal, Jharkhand. It shows

the percentage of population-wise highest in these states. Whereas, in Chandigarh, Karnataka and Maharashtra there are having a moderate number of per cent wise cases and the least percentage of cases are in the remaining states and UTs.

Figure-1: State wise Percentage of COVID positive Case



Source: Computed by Author

Figure-1 represents the percentage of COVID case, state and UTs wise in India by April 2021. Regarding percentage case wise with population, it is visible that Chhattisgarh is having the highest number of percentage cases followed by Nagaland, Punjab, J & K, Dadra

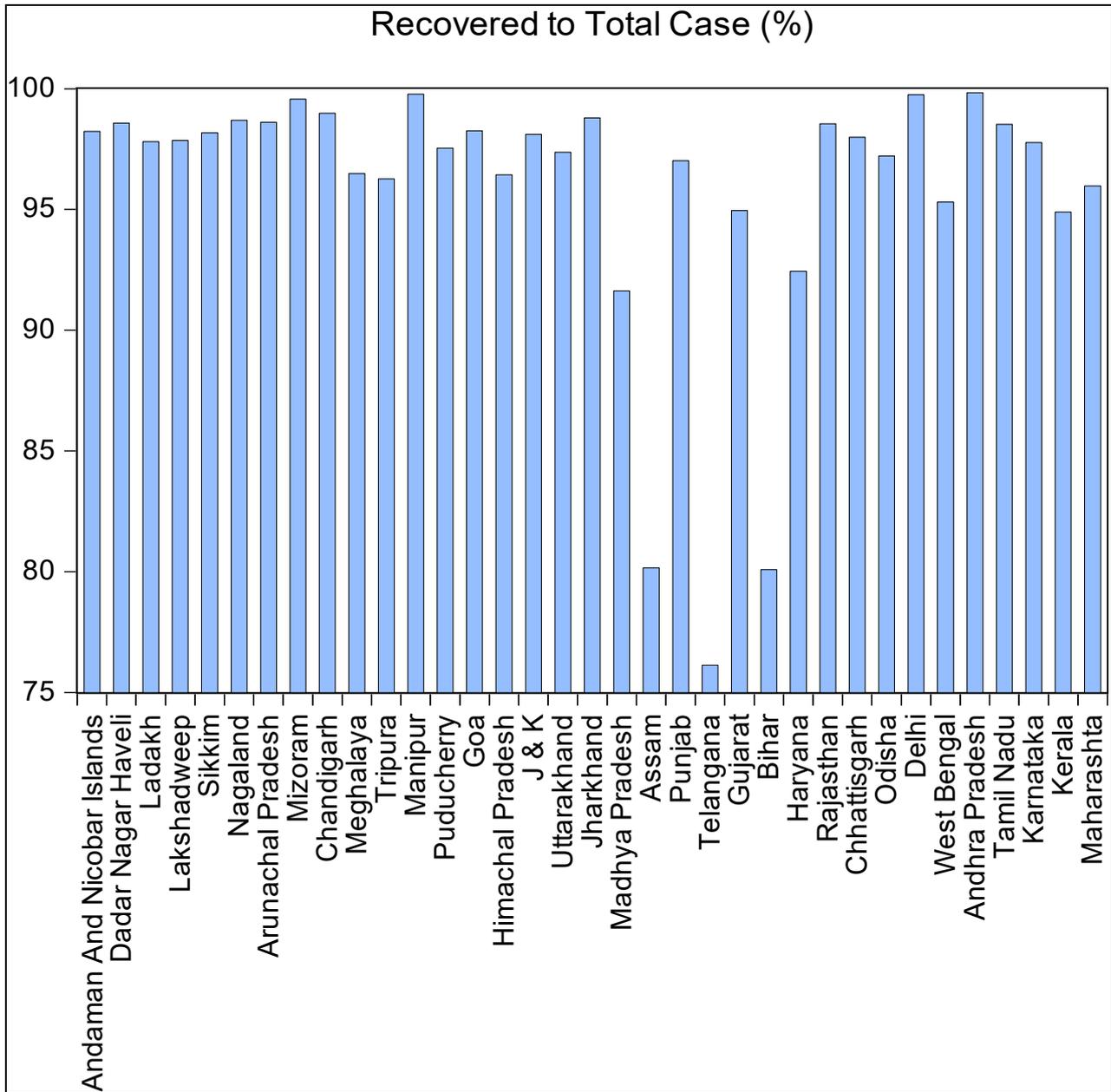
Nagar Haveli and Jharkhand. It shows the percentage of population-wise highest in these states. Whereas, in Ladakh, Puducherry, Maharashtra, and in Arunachal Pradesh there are having a moderate number of per cent wise cases and

the least percentage of cases are in remaining states and UTs like Sikkim, Assam, Delhi, and in Kerala. Hence it is depicted that Chhatisgarh

is at the top position where the highest no of cases to population is showing.

4.3 State and UT wise Analysis of Corona Virus Testing and Recovery Status

Figure-2: State wise Percentage of Corona Recover Cases

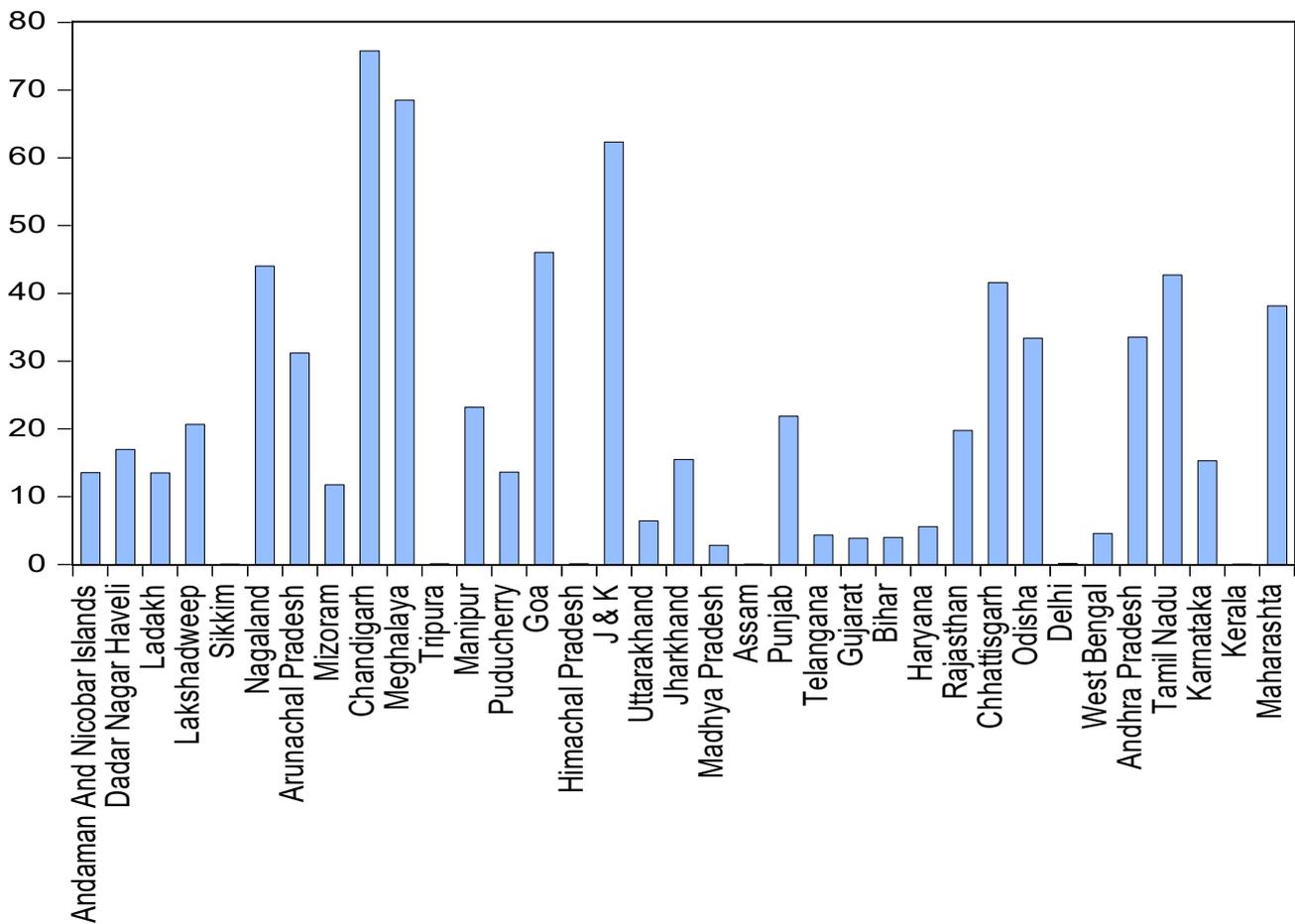


Source: Computed by Author

Figure-2 represents that the recovered case to total corona case where almost all states are having a good status regarding recovered cases except Telengana where the recovery rate is relatively less followed by Assam, and Bihar.

The States like Delhi, Andhra Pradesh and Manipur are having the highest recovery rate. Therefore, it is assumed that in these States may be better health infrastructure.

Figure-3: Testing Rate
Testing to Population (%)



Source: Computed by Author

Figure-3 represents the testing rate of all States and UTs by April 2014. Here the States which is in the top position in Chandigarh where it is shown that the rate of testing is highest among all States and UTs followed by Meghalaya and J & K. The States those are having a moderate level of testing are Nagaland, Goa, Chhattisgarh, Tamil Nadu, Maharashtra, Odisha and Andhra Pradesh. The least number of testing carried by the States like Sikkim, Tripura, Kerala, Arunachal Pradesh, Assam and Delhi.

5. The Economic Consequences of COVID-19

The sizable effects of the pandemic are becoming apparent. The consequences of COVID-19 are of four fold. The assessment of the impact on the economy has been operationally defined as the impact on the following key economic indicators:

- a) GDP
- b) Unemployment rate
- c) Inflation rate
- d) Industry output

5.1 Impact on GDP in India

This Corona virus shock comes at a particularly inopportune time for India, as the economy was already on a very concerning downward trajectory since the turn of FY 2018-19. More specifically, on a quarterly basis, India’s growth rate fell from around 8 per cent in Q4 FY18 to a new low of 4.5 per cent in Q2 FY20. The Indian economy contracted by 7.3 per cent in fiscal 2020-21 as the country battled the first wave of COVID, as against a 4 per cent growth in 2019-20. It is expected that the overall hit to India's economy to be softer than that during the first wave last year. However, the pace of recovery will be determined by the pace of vaccination, and the strength of the recovery in private

consumption, which could be hampered by the deterioration of balance sheets of low and middle-income households from job, income and wealth losses. RBI has lowered its estimate for economic growth to 9.5 percent for 2021-2022 from earlier projection of 10.5 percent due to the impact of the second COVID-19 wave. The lockdown going to impact the growth since the most important and the fastest growing sector of Indian economy are services. Trade, hotels, transport and communication;

financing, insurance, real estate and business services and community, social and personal services account for more than 60 percent of GDP. Agriculture, forestry and fishing constitute around 12 percent of the output, but employs more than 50 percent of the labor force. Manufacturing accounts for 15 percent of GDP, construction for another 8 percent and mining, quarrying, electricity, gas and water supply for the remaining 5 percent.

Table-6 Impact of Covid-19 on GDP

S. N	Time period	% GDP Growth	% GDP Growth (Service Sector)	% GDP Growth (Manufacturing Sector)	% GDP Growth (Agriculture Sector)
1	FY21 (Reflection of first wave)	-7.3	-16.00	-7.2	3.4
2	% contribution of overall GDP	Nil	55.00	17.4	17.8
3	Expected impact of second wave	8.2-9.3	Lower that first wave	Lower that first wave	Higher that first wave

Source- Ministry of Statistics and Programme Implementation, Govt. of India

5.2 Impact on Unemployment rate

As per Centre for Monitoring Indian Economy,(CMIE), the second wave has harmed self-employed and informal workers in cities .The unemployment rate touched 7.3 per cent with urban 8.4 %and rural 6.7 % in the week ended July 23, 2021. The unemployment rate was 7.97 per cent in April 2021. This

unemployment rate seen in recent times indicates toll on the economy. This has a vast negative impact on economy of India with 130 Crores of population. Unemployment wastes resources, generates redistributive pressures and distortions, increases poverty, limits labor mobility, and promotes social unrest and conflict

Unemployment Rate in India (%)

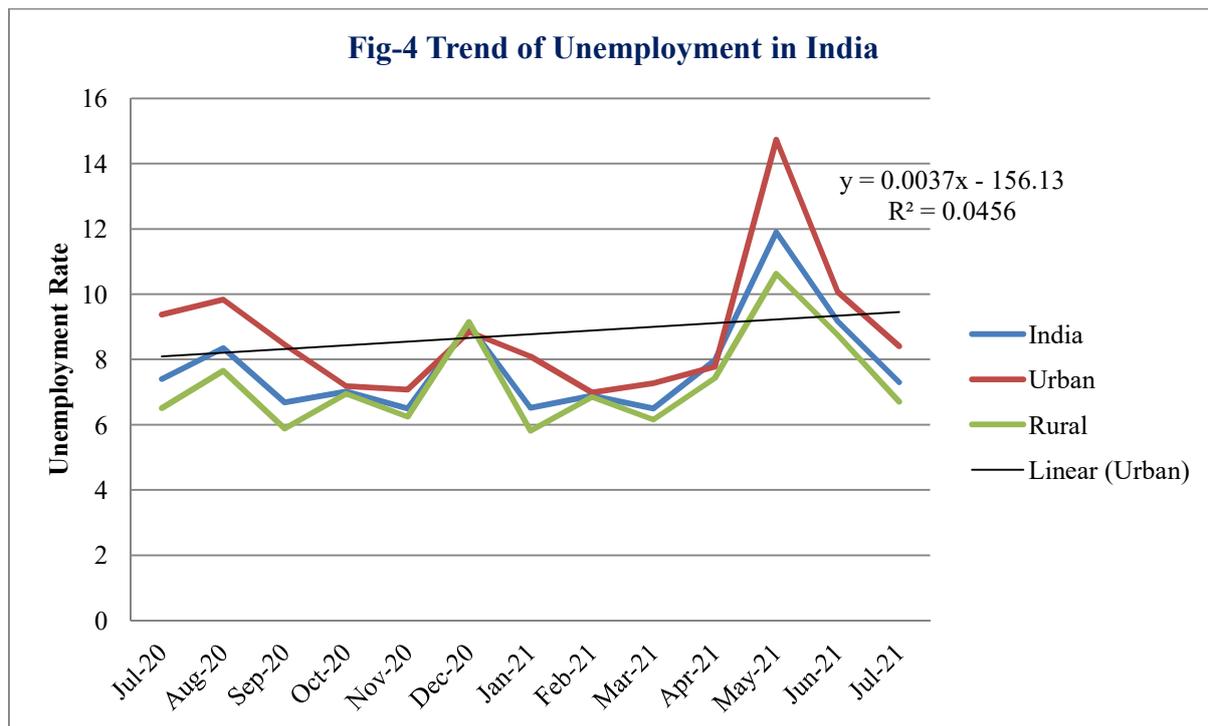
Table-7 Unemployment Rate (%)

Month	India	Unemployment Rate(%)	
		Urban	Rural
Jul-20	7.4	9.37	6.51
Aug-20	8.35	9.83	7.65
Sep-20	6.68	8.45	5.88
Oct-20	7.02	7.18	6.95
Nov-20	6.5	7.07	6.24
Dec-20	9.06	8.84	9.15
Jan-21	6.52	8.09	5.81
Feb-21	6.89	6.99	6.85
Mar-21	6.5	7.27	6.15
Apr-21	7.97	7.78	7.43
May-21	11.9	14.73	10.63
Jun-21	9.17	10.07	8.75
Jul-21	7.3	8.4	6.7

Source- CMIE data

The trend of unemployment from July, 2020 to July, 2021 during Corona Pandemic severity

period has increasing trend as shown in line graphs in Fig-4.



5.3 Impact on Inflation

The inflation depends on the recovery of the economy. If the recovery is weak, certainly it will adversely impact inflation, because consumption will not be contained below a certain limit. Supply rationing from government will also have limitations, and, hence, normalcy in the supply chain will only ensure that the inflation is kept under check.

The factors that are likely to affect inflation are :

- Crude oil prices
- Demand in the aftermath of COVID-19 pandemic
- Governments efforts to ensure supply of essential items

As of now, the government has not passed on to the consumers any reduction in oil prices. Petrol and diesel continue to sell at the old rates. This is something that the government is holding in its hand, which can use to curb inflation if it crosses reasonable limits. Further the demand itself has taken a major beating and is expected to keep the prices under check. At

the same time, government has aggressively launched supplies of essential food items through rationing and other sources, which again, is likely to keep inflation under check. As the stock of items gets exhausted, the government will allow selective production facilities to resume operations with the use of adequate safety measures. All these measures together are likely to keep inflation in the year 2020–2021 under some check. The average inflation rate for the year 2020–2021 and 2021–22 is not likely to go beyond 5 to 6%.

5.4 Impact on Monetary Policy Indicators

The Reserve Bank is in action since the beginning of pandemic with efforts to alleviate financial stress, build confidence and keep the financial system sound and functioning. In recent monetary policy RBI left the key policy rate unchanged at eight per cent, defying pressure from the finance ministry to lower rates. The central bank, however, cut the cash reserve ratio (CRR), to 4.25 per cent, freeing up Rs 17,500 crore of additional funds.

Table- 8 RBI June-21 Monetary Policy highlight

Indicator	Current Rate (%)
CRR	4.0
SLR	18.00
Repo Rate	4.00
Reverse Repo Rate	3.35
Marginal Standing Facility Rate	4.25
Bank Rate	4.25
Repo rate by RBI	
February-2020	5.15
March-2020	4.40
May-2020	4.00
August-2020	4.00
October-2020	4.00

Some of the announcements of RBI since the beginning of pandemic:

1. Cut repo by 40 basis points to 4.0 % from 4.4% earlier.
2. Cuts reverse repo by 25 basis points
3. Undertaking TLTRO-2.0 (Targeted longer-term refinancing operations) for amount of Rs 50,000 crore to begin with in tranches of appropriate sizes
4. In respect of all accounts for which banks and financial institutions grant a moratorium, the 90-day NPA norm will exclude moratorium period.
5. Asset classification standstill for all accounts where moratorium granted.
6. To provide special refinance facilities of Rs 50,000 crore to NABARD, SIDBI, NHB to address sectoral credit needs.
7. LCR requirement for scheduled commercial banks is being brought down to 80 percent from 100 percent with immediate effect.
8. Date for commencement of commercial operations, in NBFCs loans to commercial realty projects, can be extended by 1 year.

5.5 Impact on India's industrial output

Industrial production in India rose 29.3 percent year-on-year in May of 2021, below market expectations of 32 percent as regional lockdowns in most states to contain the second wave of the coronavirus pandemic hurt activities. Manufacturing production advanced 34.5 percent, led by motor vehicles, trailers and semi-trailers (208.2 percent) and textiles (165.2 percent). Also, output rose for mining (23.3 percent) and electricity (7.5 percent). But IIP growth numbers in April and May were bound to be exaggerated this year as last year output had come to a standstill in most sectors. Therefore, the growth numbers for April, which are exceptionally high, need to be ignored. Chief economist of India Ratings and Research, said, "Comparing April 2021 IIP data with April 2019 shows that some of the grounds that industrial output had covered in March 2021 (going by past production levels witnessed during the pre-lockdown month of February 2020) has again been lost in April 2021.

Table-9 Annual Indices of Industrial Production

Use-based category	Weight	As per Base 2011-12			W.r.t. previous year		
		2018-19	2019-20	2020-21	2018-19	2019-20	2020-21
Primary goods	34.0486	126.1	127.0	118.1	3.5	0.7	-7.0
Capital goods	8.2230	108.4	93.3	75.7	2.7	-13.9	-18.9
Intermediate goods	17.2215	126.2	137.7	124.7	0.9	9.1	-9.4
Infrastructure/ construction goods	12.3384	141.7	136.6	124.7	7.3	-3.6	-8.7
Consumer durables	12.8393	130.4	119.0	100.9	5.5	-8.7	-15.2
Consumer non- durables	15.3292	145.5	145.3	142.4	4.0	-0.1	-2.0

Source -Ministry of statistics and Programme Implementation, Govt. of India

The level of industrial output of April 2021 does not provide an encouraging picture. This is the case when industries were allowed to remain operational during second wave-related lockdowns albeit with strict COVID protocols/lower employee headcounts. Clearly, the path to economic recovery and meaningful economic growth may be possible in 2023.

6. Key findings of Study

Health infrastructure, doctors, and paramedical staff are key determinants of corona death in India. The situation in all the states is not uniform with regard to health infrastructure and Corona virus testing and positive cases. It is observed that Maharashtra, Gujarat, Delhi, Madhya Pradesh, Uttar Pradesh, Andhra Pradesh and West Bengal are in a little bit dangerous situation. Among the remaining states Punjab, Rajasthan, Tamil Nadu, Bihar are in a moderate situation, whereas, Haryana, Kerala, J & k, Telengana and Karnataka are in a little bit controlled category. Moreover, the highest number of cases in Maharashtra is followed by Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, WB, and Delhi. Whereas, the least number of COVID cases are in Andaman Nicobar Islands, Dadra Nagar Haveli.

Among all states, Kerala is having the highest number of nurses who are treating the positive cases. It means the highest percentage of nurses is there in Kerala. Out of the remaining states and UTs, Puducherry, Chandigarh and Andaman Nicobar Islands are in the following position regarding the availability of nurses serve in COVID hospital. Lakshadweep, Goa, Delhi, Dadra Nagar Haveli and Punjab are having a manageable level of percentage of Nurses in COVID hospital. Regarding the lowest per cent of nurses serve in Bihar, UP, and Tripura. Just like any country, India has struggled against the corona virus pandemic.

Various factors like financial inequality, inadequate healthcare, and a huge population have made the matter even worse. In April 2020, after conducting the maximum number of tests in the country, the state of Maharashtra was able to detect over 1,900 cases. For the same period, the state of Sikkim carried out the minimum number of tests with zero cases detected.

7. Conclusion

The Corona crisis is about personal as well as economic survival. The costs of corona pandemic will be disproportionately higher for the poor, who, unlike the better off, have neither the luxury of working from home nor enough of a savings pool to exhaust while not earning. But it also needs to be reiterated that under normal circumstances, the poor are actually more vulnerable to deaths from being ill, as they can neither avail treatment nor afford adequate diets to recover from their ailments. The biggest learning from the Corona pandemic for India is to stop looking for leadership or overly rely on the China for imports and the US for patronage. Atmanirbhar Bharat must be viewed as a “hybrid model” of economic nationalism, one that is not overly protectionist or insular to inbound FDI. The Indian economy is showing signs of revival since the peaking of second wave in first half of May 2021 on the back of targeted fiscal relief, strong push for capital expenditure. However the momentum of economic recovery was moderated by the onset of the second wave of Covid-19. India must lessons from both corona virus waves and improve it's preparedness for future waves of this pandemic. There is urgent need to health care expenditure and improve health infrastructure in all states of India to effectively fight against the Corona virus disease.

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