

COVID-19: Global Economic Impact of Novel Coronavirus with Special Reference to India

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ABSTRACT

The objective of the paper is to analyse the impact of coronavirus in major countries of the world with special reference to India. The outbreak of a novel human coronavirus has become a global health concern causing severe respiratory infections in humans. The virus is rapidly spreading and the number of persons infected across nations is significantly increasing as no specific therapies are available for the disease. Only isolation, containment and prevention of further spread are crucial to arrest the outbreak and to control infectious disease. There is direct disruption to global supply chains due to the outbreak of coronavirus. Lesser demand for goods and services which are imported and decrease of tourists around the globe are adverse effects of this disease. Higher public investment along with other fiscal support needs to be promoted and long term low interest rate is essential to push the global economy.

Keywords: Coronavirus, Health care System, Infection, Isolation, Outbreak, Quarantine, COVID-19.

Introduction

COVID-19 is an infectious disease caused by coronavirus which was discovered recently in December, 2019 in China. The World Health Organisation declared Coronavirus as a 'Pandemic' which refers to an epidemic that has spread at Global level affecting large numbers of people. 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). The coronavirus (COVID-19) outbreak resulted in substantial human suffering and major economic disruption. The Coronavirus may cause illness in animals or humans. Several coronaviruses can cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) in human. Due to the

high death rate and the potential to cause epidemic, it is needed to develop curative and preventive policy and action. However, the number of affected people is rising in 210 countries of the world in every hour. A large-scale programme to identify and screen exposed persons should help control the virus. However, this is a very challenging and time-consuming task. Due to lack of specific treatment or a vaccine, the psychological and economic stresses resulting from control measures such as mass quarantining should not be underestimated. Authorities need to be mindful of both the potential negative and positive impacts of social media in managing outbreaks of infection in the community.

Literature Review

There is scanty literature available on impact of Coronavirus. Some key literature are as follows.

S. Khan, A. Ali, R. Siddique, G. Nabi (2020) in their study mentioned that the year of 2020 began with deep concern

associated with the onset of a novel coronavirus outbreak in Wuhan, China. Coronaviruses have become associated with deadly respiratory infections in humans following the emergence of severe acute respiratory syndrome. G. Kampf, D. Todt, S. Pfaender, E. Steinmann (2020) observed that human coronaviruses such as Severe Acute Respiratory Syndrome can persist on inanimate surfaces like metal, glass or plastic for up to 9 days, but can be efficiently inactivated by surface disinfection procedures with 62–71% ethanol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite within 1 minute. As no specific therapies are available for SARS-CoV-2, early containment and prevention of further spread will be crucial to stop the ongoing outbreak and to control this novel infectious thread. Jonathan M. Read et al (2020) estimated that the basic reproductive number of the infection to be significantly greater than one. They estimated it to be between 3.6 and 4.0, indicating that 72-75% of transmissions must be prevented by control measures for infections to stop increasing. Maimuna Majumder and Kenneth D. Mandl(2020) observed that the impact of pre-prints on discourse and decision making pertaining to the ongoing COVID-19 outbreak suggests that we must rethink how we reward and recognise community contributions during present and future public health crises. R. Prasad, Bindu Shajan Perappadan, Jyoti Shelar, Jacob Koshy, P.J. George (2020) mentioned that the new coronavirus is a respiratory virus which spreads primarily through droplets generated when an infected person coughs or sneezes, or through droplets of saliva or discharge from the nose.

K. Roosa, Y. Lee, R. Luo, A. Kirpich, R. Rothenberg, J. Hyman, P. Yan, and G. Chowell, (2020) found that the containment strategies implemented in China are successfully reducing transmission and that the epidemic growth has slowed in recent days.

Coronavirus: A Global Perspective

The coronavirus outbreak is one of the biggest challenge to the economy and financial markets of the Globe. The economic activities remain subdued and very uncertain resulting significant suffering of human life and economic disruption. There is direct disruption to global supply chains due to the outbreak of coronavirus. Lesser demand for goods and services which are imported and decrease of tourists around the globe are adverse effects of this disease. Higher public investment along with other fiscal support needs to be promoted and long term low interest rate is essential to push the global economy. Financial market became risky with a sharp decline in equity prices, decline in commodity prices, a record low of interest rate in USA and low confidence of consumers and producers in business. Table 1 presents statistics of most affected 16 countries of the world.

Among top 16 most affected cases of Coronavirus, USA are the highest affected country with 10, 10507 positive cases and 56803 death cases. It is quite interesting to note

Table 1: COVID-19 Statistics in top 16 most affected Countries as on 28th April, 2020

Country	Total Positive Cases	Total Deaths	Recovered	Cases	Tests	% of Recovered to Case	% of Death to Case	% of Positive to Tests
World	3,072,863	211,738	924,578	1,936,547	NA	30.09	6.89	NA
USA	1010507	56,803	139,162	814,542	5,696,928	13.77	5.62	17.74
Spain	229,422	23,521	120,832	85,069	1,345,560	52.67	10.25	17.05
Italy	199,414	26,977	66,624	105,813	1,789,662	33.41	13.53	11.14
France	165,842	23,293	45,513	97,036	463,662	27.44	14.05	35.77
Germany	158,758	6,126	114,500	38,132	2,072,669	72.12	3.86	7.66
UK	157,149	21,092	NA	135,713	719,910	NA	13.42	21.83
Turkey	112,261	2,900	33,791	75,570	918,885	30.10	2.58	12.22
Russia	93,558	867	8,456	84,235	3,139,258	9.04	0.93	2.98
Iran	91,472	5,806	70,933	14,733	432,329	77.55	6.35	21.16
China	82,836	4,633	77,555	648	NA	93.62	5.59	NA
Brazil	67,446	4,603	31,142	31,701	339,552	46.17	6.82	19.86
Canada	48,500	2,707	18,268	27,525	733,705	37.67	5.58	6.61
Belgium	46,687	7,207	10,878	28,602	214,042	23.30	15.44	21.81
Netherlands	38,245	4,518	NA	33,477	193,950	NA	11.81	19.72
India	29,451	939	7,137	21,375	716,733	24.23	3.19	4.11
Switzerland	29,164	1,665	22,200	5,299	245,300	76.12	5.71	11.89

Source: World Meters, Coronavirus, WHO and Author's calculation

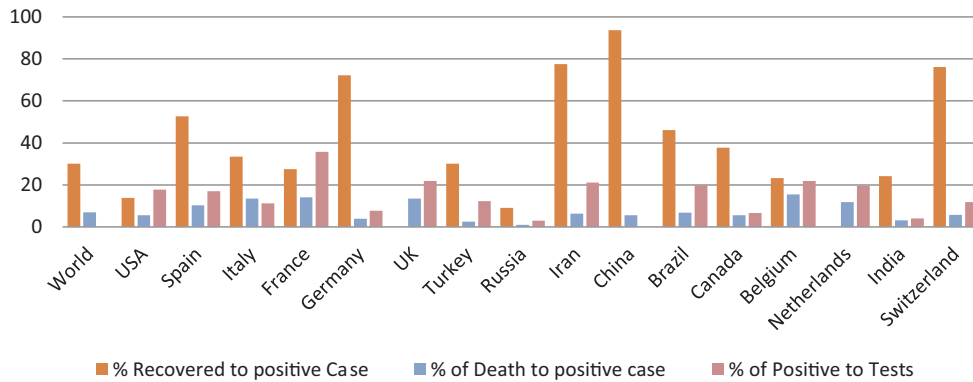


Figure 1: Percentage of Recovery, Death and Positive Case

that the percentage of death to positive cases is the highest in Belgium followed by Italy. Most of the European countries are the worst affected by coronavirus. Among the European countries, Italy is the worst affected due to high transmission rate and good economic relation with China. There is large number of tourists to China from Italy which transmitted the virus. Figure 1 clearly shows that percentage of recovery to corona positive cases is the highest in China followed by Iran, Switzerland and Germany. The percentage of death to positive cases is the higher in Belgium, France and Italy.

However, India has done much better so far as in terms of containing the spread of coronavirus is concerned with India reaching 16,000 cases on 80th day, whereas China had touched it on 14th day, Italy on 44th day and Iran on 28th day among others.

COVID-19 Cases and Deaths according to Age, Sex and Existing Conditions

The deaths due to coronavirus vary according to age, sex and conditions due to changes in immunity power.

(1) Age of Coronavirus Deaths COVID-19 Fatality Rate by AGE

The Coronavirus deaths vary as per age of affected person. **Death Rate** = (number of deaths/number of cases) = **probability of dying if infected by the virus (%)**. This probability of death differs depending on the age group. The range of age and death rate is shown in Table 2.

People in all ages can be affected by the disease, the senior people aged 80 and above are at the highest risk of death due to COVID-19 (Disease Control and Prevention Centres in China and South Korea). Cardiovascular disease and diabetes affected people with pre-existing medical conditions have a higher fatality rate than others in Coronavirus. Figure 2 presents the relationship of age with death rate due to coronavirus.

The Figure 2 shows the decreasing death rate with decrease in age. In general, relatively few cases are seen among children.

(2) COVID-19 Fatality Rate by Sex Ratio

The probability of death differs depending on sex as immunity power differs. Smoking habits among male increases the risks of respiratory complications.

Table-2: Doubling time of COVID-19 cases comparison with other countries

No. of cases	China	India	USA	France	Italy	Spain	Iran
100	1st Day	42nd Day	44th Day	41st Day	25th Day	32rd	8th
1000	5th Day	58th Day	53rd Day	49th Day	31st Day	39th Day	13th Day
2000	6th Day	63rd Day	56th Day	52nd Day	33rd Day	41nd Day	14th Day
4000	8th Day	66th Day	60th Day	55th Day	37th Day	43th Day	17th Day
8000	11th Day	72th Day	61st Day	60th Day	40th Day	46th Day	21st Day
16000	14th Day	80th Day	62nd Day	64th Day	44th Day	50th Day	28th Day
32000	19th Day		64th Day	68th Day	50th Day	53rd Day	38th Day
64000	28th Day		67th Day	73rd Day	55th Day	57th Day	50th Day
128000			71st Day	84th Day	67th Day	65th Day	
256000			73rdDay				
512000			83rd DAY				

Source: Medical Education and Drugs Department, Maharashtra

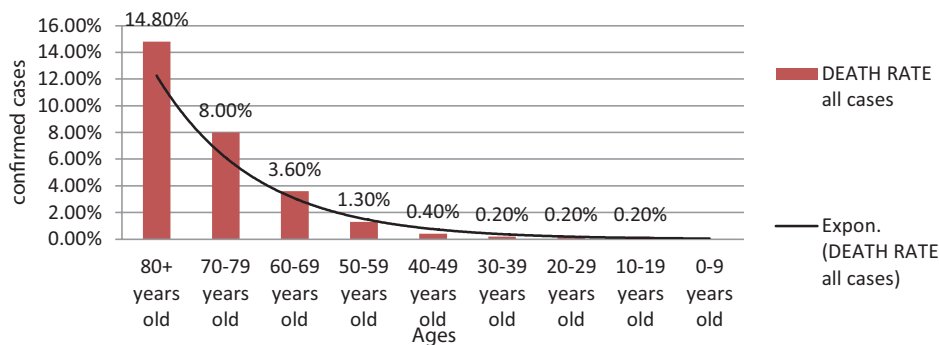


Figure 2: Age of Coronavirus Deaths COVID-19 Fatality Rate by Age

Table-3: Death Rate and Age

Age (in years)	Death Rate (All Cases) (%)
80 and Above	14.80
70-79	8.00
60-69	3.60
50-59	1.30
40-49	0.40
30-39	0.20
20-29	0.20
10-19	0.20
0-9	No fatalities

Sources: Global of Health Policy.

Table 4 shows that male coronavirus affected cases have 4.70 present death rate whereas female coronavirus affected cases have 2.80 % death rate. This variation may be due to variation in immunity power and different food habits of male and female.

Global Economic Impact of Coronavirus Pandemic

The global pandemic Corona Virus Disease (COVID-19) has put very serious challenge to the socio-economic condition of entire world, including India. At a global level as on April 28, 2020, there are infected (confirmed cases) of 30 lakh peoples and more than 2.0 Lakhs deaths which are 7 per cent of the total cases, affected more than 210 countries and damaged economies to irrecoverable levels. Outbreak of the coronavirus has already resulted in significant human suffering and economic disruption. Declaration of Containment Zones in affected areas, restrictions on labour movement, and travel from one place to another place and shutdown in many service sector activities reduced the transmission of virus. These steps and restrictions by the Government resulted in a reduction in substantial output of goods. Subsequently, the other countries such as Korea, Italy, USA and other European Countries have started containment measures

Table 4: Death Rate by Sex

Sex	Death Rate Confirmed cases (%)	Death Rate All cases (%)
Male	4.70	2.80
Female	2.80	1.70

Sources: Global of Health Policy.

like quarantines and border closures. The effects of these restrictions are important because it causes the disruption to supply network of the world along with reduced final demand for consumer and producer goods and services imported and reduction in international tourism and business travel.

Global Risks of Coronavirus and Economic Growth

Economic growth reduces if downside risks materialize more due to outbreak of corona virus. If Virus outbreaks spread more widely in the European countries, it has the adverse effects on economic growth of world. The international trade becomes much worse and more widespread. Many studies show that in 2020, growth rate of Gross Domestic Product of world may be reduced by 1.50 per cent which could push several countries into recession and severe depression. The important downside risks are as follows.

- 1) The adverse impacts on trade and investment will be aggravated .Further, other bilateral trade tensions between the United States and Europe may continue. There will be more trade disruptions and disputes which will require intervention of World Trade Organisation (WTO).
- 2) A downside risk and uncertainty may arise due to lack of official trade agreements. The prospects of economic growth may be reduced significantly and more volatile if export and import of trade between the European Union and United Kingdom will revert back to WTO terms and conditions after 2020. The volatility

and instability in financial market conditions and consumer confidence shall deteriorate day by day.

- 3) More disruptions across the globe will arise due to continuous financial vulnerabilities, slower growth rate, rise in corporate debt and deteriorating credit quality. The recently floated bonds which are BBB-rated may be downgraded to non-investment grade due to the coronavirus spread. If the spread of virus will continue, the risk of significant corporate stress may lead to economic downturn.

Monetary Policy and Fiscal Policy to Tackle Adverse Impact of COVID-19 in the World

Due to uncertainty out of the coronavirus outbreak, monetary policy needs to be proactive and supportive for economic growth. So, it is essential that the monetary policies of a country may be n supportive to ensure that long-term interest rates shall remain low. The quick impact of monetary policy may be reflected in prices of asset and investment of private sector. Many emerging economies with flexible exchange rate have scope to further simplify monetary policy if inflation is reduced.

It is further necessary to enhance investor's confidence by adopting appropriate fiscal and structural measures. Extreme low interest rates can provide an opportunity to activate the fiscal policy and to strengthen consumer's demand. This increase in temporary expenditures will smoothen the impact of the coronavirus outbreak on marginalised social groups. When the effects of the pandemic starts to decline, the discretionary support of fiscal policy will depend on the success of cyclical movements, fiscal stabilizers and debt sustainability policy.

These are as follows-

- 1) Some discretionary fiscal policies are undertaken in many advanced countries including United Kingdom, Germany, Canada, Korea, Japan, and France. For debt sustainability, more fiscal stimulus measures should be implemented in a phased manner.
- 2) In many advanced economies with high debt and deficits in budget, there is limited scope for sizeable discretionary fiscal policy. Changes in the structure of expenditure and taxes can support economic activity to enhance economic growth.
- 3) A tighter fiscal policy with social transfers to marginalised groups safeguarding and maintaining balance

between public and private investment is highly essential in view of coronavirus.

Expenditure in health care, sanitation and education should be increased to promote demand and push the standard of living of people. Reductions in policy interest rates and more reforms to increase competition can work effectively to bring higher growth. G20 countries gain from collective action and cooperation among themselves. The forecast of OECD on global economic impact of COVID-19 on real GDP is quite interesting which is given in Table 5.

The projection shows decline in real GDP in all countries after outbreak of Coronavirus in the world except Brazil where the difference is 0.00.

Novel Coronavirus Outbreak and India's Health Care System

India is facing for a potential explosion of coronavirus cases as it is thickly populated with large number of poor people with less resources. India's health performance index which includes access to primary care, maternal mortality rates and child health, runs the spectrum, with some states outperforming others by almost 2.5 times. The best performer is Kerala that found and treated India's first three corona cases. The worst is Maharashtra which has detected many positive cases and deaths. The inequalities are further pronounced between urban and rural areas with most of the available beds are concentrated in Indian cities. According to WHO, India spent an average of \$62.72 per person on health care in 2016 as compared to China's \$398.33. Inequalities could make prevention even harder. In places with limited access to clean water, washing hands to prevent the spread of the virus is difficult. Health management system is very inadequate for India's existing problems. With limited access to clean water, washing hands to prevent the spread of the virus is very difficult (Gagandeep Kang, 2020). These inequalities are not just a reflection of not spending enough on health care, but also of not knowing where to spend.

COVID-19 Statistics in India

States are taking aggressive action to slow down the spread of the novel coronavirus and prepare their health care systems for dealing with those affected by COVID-19. Many states have also implemented policies to increase access to COVID-19 testing and treatment, as well as continued management of other health conditions. State wise COVID-19 statistics are shown in Table 6.

Table 5: Forecasts on Real GDP (% change in growth)

	2019	Interim EO Projections	2020 Difference from November EO	Interim EO projections	2021 Difference from November EO
World	2.9	2.4	-0.5	3.3	0.3
G20	3.1	2.7	-0.5	3.5	0.2
Australia	1.7	1.8	-0.5	2.6	0.3
Canada	1.6	1.3	-0.3	1.9	0.2
Euro area	1.2	0.8	-0.3	1.2	0.0
Germany	0.6	0.3	-0.1	0.9	0.0
France	1.3	0.9	-0.3	1.4	0.2
Italy	0.2	0.0	-0.4	0.5	0.0
Japan	0.7	0.2	-0.4	0.7	0.0
Korea	2.0	2.0	-0.3	2.3	0.0
Mexico	-0.1	0.7	-0.5	1.4	-0.2
Turkey	0.9	2.7	-0.3	3.3	0.1
United Kingdom	1.4	0.8	-0.2	0.8	-0.4
United States	2.3	1.9	-0.1	2.1	0.1
Brazil	1.1	1.7	0.0	1.8	0.0
China	6.1	4.9	-0.8	6.4	0.9
India	4.9	5.1	-1.1	5.6	-0.8
Indonesia	5.0	4.8	-0.2	5.1	0.0
Russia	1.0	1.2	-0.4	1.3	-0.1
Saudi Arabia	0.0	1.4	0.0	1.9	0.5
South Africa	0.3	0.6	-0.6	1.0	-0.3

Source: OECD Interim Economic Outlook, 2020.

The total number of novel coronavirus cases in India is increasing every day. Maharashtra is worst hit with coronavirus. The government is taking strict measures to stem the spread of the deadly coronavirus, which has killed seven people. Gujarat, Bihar and Maharashtra reported a death each on Sunday, while four deaths were earlier reported from Karnataka, Delhi, Maharashtra and Punjab, the Health Ministry said. Eighty cities including Delhi, Mumbai, Kolkata, Chennai and Bengaluru went into complete lockdown till 31 March. Trains, metros and inter-state buses have been shut from today, only essential services like milk, vegetables, medicines, grocery and ATMs will be available during the shutdown. The Centre has issued directions to state governments, asking them to take legal action against those who are found violating the lockdown orders.

The weekly status of Coronavirus Positive Cases in India is given in Table 7. It shows declining growth rates of positive cases in India.

Less Testing LABS and Inadequate Hospitals in India

India is enhancing its ability to test and detect the virus. But important concern over India's overstretched health

infrastructure is a single state-run hospital for every 55,591 people on average and a single hospital bed for every 1,844 people. India needs about 10 times more doctors to meet the norms prescribed by the World Health Organization, a shortfall of at least 500,000 doctors. Experts fear that an epidemic would cause other routine health care functions to suffer. All states in the country are focused on controlling the transmission and curtailing morbidity and mortality due to the pandemic. It is important to see that how this infection and its fallouts can impact the healthcare scenario in India (Anu Grover, Meenu Grover Sharma, 2020). In India, the government facilities to test for the virus include 52 labs belonging to the Viral Research and Diagnostic Laboratories network of the Indian Council of Medical Research (ICMR), 10 labs under the National Centre for Disease Control (NCDC) and the NIV.

Pre-existing medical conditions (Comorbidities)

Patients who reported no pre-existing (comorbid) medical conditions had a case fatality rate of 0.9%. Pre-existing illnesses that put patients at higher risk of dying from a COVID-19 infection are given in Table 9.

Table 6: State wise COVID-19 statistics as on 21 April, 2020

S.No	Name of State / UT	Total Confirmed cases	Cured/ Discharged / Migrated	(Cured/ Confirmed ×100)	Death	No of affected districts
1	A and N Islands	18	11	61.11	0	1
2	Andhra Pradesh	813	120	14.76	24	11
3	Arunachal Pradesh	1	1	100	0	1
4	Assam	35	19	54.29	1	12
5	Bihar	143	46	32.17	2	14
6	Chandigarh	27	14	51.85	0	1
7	Chhattisgarh	36	26	72.22	0	5
8	Delhi	2248	724	32.21	48	11
9	Goa	7	7	100	0	2
10	Gujarat	2407	179	7.44	103	27
11	Haryana	262	140	53.44	3	19
12	Himachal Pradesh	40	18	45	1	6
13	Jammu and Kashmir	407	92	22.6	5	14
14	Jharkhand	49	8	16.33	3	8
15	Karnataka	427	131	30.68	17	21
16	Kerala	438	323	73.74	3	14
17	Ladakh	18	14	77.78	0	2
18	Madhya Pradesh	1592	148	9.3	80	27
19	Maharashtra	5652	789	13.96	269	32
20	Manipur	2	2	100	0	2
21	Meghalaya	12	0	0	1	1
22	Mizoram	1	0	0	0	1
23	Odisha	83	32	38.55	1	10
24	Puducherry	7	3	42.86	0	2
25	Punjab	251	49	19.52	16	19
26	Rajasthan	1890	230	12.17	27	26
27	Tamil Nadu	1629	662	40.64	18	35
28	Telangana	945	194	20.53	23	28
29	Tripura	2	1	50	0	2
30	Uttarakhand	46	23	50	0	52
31	Uttar Pradesh	1449	173	11.94	21	6
32	West Bengal	456	79	17.32	15	17
Total number of confirmed cases in India		21393	4258	19.90	681	429

Source: Ministry of Health and Family Welfare, Govt. of India.

Table 7: Weekly status Coronavirus Positive Cases in India

Weekly Status	Corona Positive Cases in India	Weekly Growth rate (%)
17 March, 2020	137	—
25 March	606	342.34
1 April	1966	224.42
8 April	5749	192.42
15 April	12021	109.10
21 April	20004	66.41
28 April	28380	41.87

Source- Health and Family welfare, Govt. of India and Authors Calculation

The fatality rate for those with cardiovascular disease was the highest. Diabetes and respiratory diseases too increased the fatality rate.

The health observatory expenditure is shown in Table 10.

The total health expenditure on health in India is only 4.7 percent of GDP which is low compared to other countries. There is urgent need to increase it to at least 6 percent of GDP.

Table 8: COVID-19 Test Centres in India

S. No	State/UT	Total List of Medical Lab	DHR/ICMR laboratories	State/UT	Total List of Medical Lab	DHR/ICMR laboratories
1	A.P	4	4	Maharashtra	3	2
2	A & N Islands	1	0	Manipur	2	1
3	Assam	4	4	Odisha	1	1
4	Bihar	1	3	Puducherry	1	1
5	Chandigarh	1	1	Punjab	2	0
6	Chhattisgarh	1	1	Rajasthan	5	2
7	Delhi-NCT	1	1	Tamil Nadu	4	7
8	Gujarat	2	4	Tripura	1	0
9	Haryana	2	0	Telangana	2	2
10	H.P	2	0	U.P	3	1
11	J & K	3	1	Uttarakhand	1	2
12	Jharkhand	1	1	West Bengal	2	5
13	Karnataka	5	2	Maharashtra	3	2
14	Kerala	4	1	Manipur	2	1
15	M.P	2	4	Odisha	1	1
16	Meghalaya	1	0	Puducherry	1	1
Total					52	57

Source: Indian Council of Medical Research, New Delhi.

Table-9: Pre Existing Condition and Death Rates

Pre-Existing Condition	Death Rate confirmed cases	Death Rate all cases
Cardiovascular disease	13.20%	10.50%
Diabetes	9.20%	7.30%
Chronic respiratory disease	8.00%	6.30%
Hypertension	8.40%	6.00%
Cancer	7.60%	5.60%
no pre-existing conditions		0.90%

Source: Global of Health Policy.

Table 10: Health Observatory Expenditure in India

Total population (2016)	1,32,41,71,000
Gross national income per capita (PPP international \$, 2013)	5,350
Life expectancy at birth m/f (years, 2016)	67/70
Probability of dying under five (per 1 000 live births, 2018)	37
Probability of dying between 15 and 60 years m/f (per 1 000 population, 2016)	214/138
Total expenditure on health per capita (Intl \$, 2014)	267
Total expenditure on health as % of GDP (2014)	4.7

Source: World Health Organisation.

The Economic Impact of COVID-19 in India

The Indian economy is badly affected due to the impact of COVID-19, lock down for 40 days and large scale expenditure on treatment of corona positive patients. The Indian stock market has been significantly affected for which both Sensex and Nifty went down and affected most companies. COVID-19 severely hits aviation, retail, manufacturing, automobile, service, travel, hospitality and others. Many employees have gone on a short leave without pay or are facing cuts in their salary. Nearly 90% of India's workers belong to the informal or unorganised sectors. These workers are the most severely affected by the COVID-19 lockdown across the country. The Indian government announced a \$22.6bn stimulus package to aid the poor who are affected by the coronavirus outbreak. The Government also plans to provide wheat, rice

and pulses free of cost to approximately 800 low-income families over the next three months. Further, cooking-gas cylinders will be provided to 83 million poor families and a \$13.31 cash-transfer will be provided to 30 million senior citizens. The government will provide \$6.65 per month to approximately 200 million poor women for three months. Medical insurance worth five million rupees will be provided for healthcare workers including doctors, nurses and paramedics.

The economic impact of COVID-19 on important sectors in India is discussed below.

(1) Agriculture, Mining and Quarrying

The Coronavirus outbreak can adversely impact the Indian economy by a whopping \$29 billion in a

hypothetical worst-case scenario, according to a study conducted by Asian Development Bank (ADB) on the economic impact of COVID-19 outbreak on developing Asia region. As per the ADB study, GDP and employment losses in the worst-case scenario from COVID-19 will be in sectors such as agriculture, mining and quarrying (\$6.89 billion), business, trade and public services (\$15.86 billion), light and heavy manufacturing and construction (\$3.39 billion), hotel and restaurants (\$1.83 billion) and transport services (\$1.93 billion), taking the aggregate losses to \$29.91 billion. The Coronavirus outbreak has serious implication for the Indian economy. It has disrupted production and transport of key equipment imported for use in solar power plants in India and is likely to jack up the prices of solar power apart from impacting projects' completion schedule unless urgent measures are taken.

(2) Business, Trade, Personal, and Public Services

Light/Heavy Manufacturing, Utilities, and Construction sectors are likely to be the worst-affected by the coronavirus pandemic. However, India's top imports crude oil and gems and jewellery. Which collectively account for 46 per cent of total imports are relatively insulated from the public health crisis in China. The daily death toll due to the virus is still very high and given the number of infected people, the battle with the virus is far from over, it said. Since the severity of the virus became known, global financial markets have been on the edge. Further, five import items heavily depend on China such as electrical machinery, machinery and mechanical appliances, organic chemicals, plastics and optical and surgical instruments. These items collectively account for 28 per cent of India's import basket which will be reduced.

(3) Hotel and restaurants and Other Personal Services

The National Restaurant Association of India stated that one of the sectors worst affected by COVID-19 will be food services, estimated at Rs 4,23,865 crore in India and employing more than 700,000 people, As brick-and-mortar businesses shut down, restaurants are struggling, but small efforts are afoot to salvage whatever they can. (Anoothi Vishal, 2020).

(4) Transport Services

The world's biggest lockdown has brought transportation of goods in India to a near halt, even though the central government has exempted the sector from restrictions to halt the spread of coronavirus. Daily movement of trucks has collapsed to less than 10% of normal levels, according to All India Motor Transport Congress, an umbrella body of goods vehicle operators representing about 10 million truckers. Road transport accounts for about 60% of freight traffic in India and 87% of its passenger traffic, according to the Ministry of Road Transport and Highways.

The economic impact assessment done by Asian Development Bank is shown in Table 11. The nature of impact depends on shorter or longer containment.

In case of longer containment, the employment and GDP will reduce significantly. Maximum employment loss will be felt in transport sector and GDP will reduce significantly in manufacturing sector. The total economic impact of COVID-19 in India is shown in Table 10.

The economic impact in India assessed by Economist Intelligence Unit; Observer Research Foundation; MOSPI

Table 11: Economic Impact Assessment COVID-19 in India

Sector	Shorter containment, smaller demand shocks		Longer containment, larger demand shocks		ADDITIONAL Impact if a significant outbreak occurs	
	as % of sector GDP	as % of sector employment	as % of sector GDP	as % of sector employment	as % of sector GDP	as % of sector employment
Agriculture, Mining and Quarrying	-0.14	-0.14	-0.34	-0.33	-1.69 to -4.36	-1.7 to -4.32
Business, Trade, Personal, and Public Services	-0.12	-0.09	-0.29	-0.21	-1.68 to -4.55	-1.73 to -4.66
Light/Heavy Manufacturing, Utilities, and Construction	-0.34	-0.38	-0.84	-0.95	-1.45 to -4.22	-1.39 to -3.92
Hotel and restaurants and Other Personal Services	-0.06	-0.08	-0.15	-0.2	-1.8 to -4.58	-1.78 to -4.55
Transport services	-0.1	-0.1	-0.24	-0.23	-1.75 to -4.57	-1.75 to -4.57
TOTAL (Economy-wide)	-0.18	-0.18	-0.44	-0.44	-1.64 to -4.43	-1.64 to -4.33

Source: Asian Development Bank / ERCD data Library.

AQ1 **Table 12:** Sector-wise Economic Impact of COVID-19 in India

Sector	total GDP	Employment (in 000)	as % of sector GDP	as % of sector employment	as % of total GDP
Agriculture, Mining and Quarrying	2718732	88.05	28.32	-0.02	-0.01
Business, Trade, Personal, and Public Services	2718732	196.44	16.34	-0.01	-0.01
Hotel and restaurants and Other Personal Services	2718732	201.83	45.59	-0.18	-0.17
Light/Heavy Manufacturing, Utilities, and Construction	2718732	98.88	14.13	-0.02	-0.01
Transport services	2718732	54.74	4.71	-0.04	-0.02
All TOTAL (Economy-wide)	2718732	639.95	109.08	-0.02	-0.02

Source: Asian Development Bank / ERCD data Library.

Table 13: Economic Impact of COVID-19

Sector	Gross Value Added (GVA) in %
Financial, real estate & professional services	-17.3
Mining & quarrying	-14.7
Electricity, gas, water supply & other utility services	-13.9
Construction	-13.3
Trade, hotels, transport, communication & broadcasting services	-9.7
Overall GVA	-9.3
Manufacturing	-6.3
Agriculture, forestry & fishing	-1.3
Public administration, defence & other services	-0.4

Source: Economist Intelligence Unit; Observer Research Foundation; MOSPI.

shows that financial, real sector and professional sector will be the major loser with -17.3 gross value added followed by mining & quarrying and others.

Suggestions and Best Practices for Protection against COVID-19

The following suggestions and best practices are forwarded to control spread of Coronavirus.

1) Washing with soap

Our hands contain innumerable viruses and bacteria due to frequent use and exposure. To remove many of the virus and bacteria, complete washing with water using soap or sanitizer helps removing virus.

2) Alcohol-based hand sanitizer

The alcohol based hand sanitizer will inactivate the virus since its presence in hand sanitizers dissolve the lipid envelope. The alcohol tends to also change the shape of the mushroom-shaped protein structures that stick out of the lipid envelope. To be effective, it is necessary for the sanitizers to contain at least 60 per cent alcohol. Unlike soap lather, the alcohol does not come in contact

with all parts of the hand. So care should be taken to use sufficient sanitizer to increase the coverage.

3) Using a mask

Transmission through droplets from coughing and sneezing is one of the major routes of virus spread. So, Medicated masks help to prevent the spread of coronavirus infection. Masks may be effective in preventing transmission of coronavirus and can reduce the risk of inhaling droplets containing the virus if worn properly.

4) Social distancing

Social Distancing also called physical distancing means keeping space between yourself and other people. It is one of the best tools to avoid being exposed to this coronavirus because when someone coughs or sneezes they spray small liquid droplets from their nose or mouth which may contain virus. The World Health Organisation says that you should maintain at least 1 metre (3 feet) distance between yourself and anyone who is coughing or sneezing.

5) Avoid touching eyes, nose and mouth

To help prevent infections, it is necessary to keep our hands away from our eyes, nose and mouth. Hands touch many surfaces and can pick up viruses it can then transfer the virus to our eyes, nose or mouth. Once contaminated, hands can transfer the virus to our eyes, nose or mouth. From there, the virus can enter our body and can make us sick.

6) Practise respiratory hygiene

It means covering our mouth and nose with our bent elbow or tissue when we cough or sneeze. Then dispose of the used tissue immediately since the droplets spread virus.

7) Early medical care

Stay home is the best method to keep someone away from infection of coronavirus. If anyone having fever, cough and difficulty in breathing, seek medical attention and call in advance to the health professionals and local health authority.

8) Therapeutic strategies

Due to the high rate of mortality and potential to cause further epidemics, it is necessary to develop therapeutic and preventive strategies.

Conclusion

There is an urgent need for health professionals and policy makers to recognize the intensity and magnitude of the coronavirus and its grave socio-economic impact. Since the government takes policy decisions regarding the Coronavirus which has grave human, societal, and economic consequences. Its success lies in effective implementation and wholehearted support from all stakeholders. Concentrated effort and global cooperation is the need of the hour because prevention is beyond the scope of any one country. Effective implementation of government policies require full support of all stakeholders, including Governments, health professionals, the media, non-governmental organizations, communities and individuals. To completely do away with the coronavirus pandemic, it is necessary for international agencies and national governments to play the effective role in developing and implementing amicable and target oriented policies which prioritise the diagnosis, therapeutics and vaccines for the virus globally.

Competing Interest statement

The authors have declared that no competing interest exists.

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