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How India is dealing with COVID-19 pandemic

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ABSTRACT

India, which has the second-largest population in the world is suffering severely from COVID-19 disease. By May 18th, India investigated ~1 lakh (0.1million) infected cases from COVID-19, and as of 11th July the cases equalled 8 lakhs. Social distancing and lockdown rules were employed in India, which however had an additional impact on the economy, human living, and environment. Where a negative impact was observed for the economy and human life, the environment got a positive one. How India dealt and can potentially deal with these three factors during and post COVID-19 situation has been discussed here.

1. Introduction

Coronaviruses are enveloped RNA viruses, ranging from 60 nm to 140 nm in diameter with a crown-like appearance, found in mammals particularly in humans and birds. Coronaviruses are known to have mutated and recombined behaviour causing respiratory, enteric, hepatic, and neurologic diseases. Coronavirus has a total of seven strains which include HKU1, NL63, 229E and OC43, SARS-CoV, MERS-CoV and SARS-CoV-19 (COVID-19 being the latest), out of which first four had a mild impact on infested human with mild respiratory disease [1,2], whereas the other three caused a fatal impact on humankind. Previously in 2002–03, more than 8000 people suffered and 774 died due to SARS. In 2012, attributable to MERS-CoV, 2494 persons were infected and over 858 people lost their lives worldwide [3,4] and currently COVID-19 triggered 5,56,335 deaths infecting 216 countries worldwide (as of 11th July 2020). The genomic sequence of SARS-CoV-2 is different since it was first reported because of their mutation and recombination property.

The first outbreak of COVID-19 occurred in Wuhan, Hubei Province in early Dec 2019 where several patients with viral pneumonia were found to be epidemiologically associated with the Huanan seafood market in Wuhan. This market is famous for sell of wildlife animals and several non-aquatic animals such as birds and rabbits were also on sale before the outbreak. On 30th January 2020, the World Health Organization (WHO) declared an outbreak, a Public Health Emergency of International Concern (PHEIC) and on Feb 2020, WHO officially named this outbreak of the disease associated with the coronavirus as COVID-19 where CO-Corona, VI-Virus D- Disease, and 19–2019 is the year it primarily occurred. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is the root cause behind COVID-19 disease. SARS-CoV-2 has a 79.6% sequence match to SARS-CoV and is 96% identical to a bat-derived Severe Acute Respiratory Syndrome (SARS)-like CoronaVirus [5,6]. Current assessments indicated that COVID-19 has a median incubation period of 3 days (range 0–24 days), with potential asymptomatic transmission [7].

It took 67 days (~7th march) to infect 1 lakh people from COVID-19, an additional 12 days (~19th March) to infiltrate further 1 lakh and with a third invasion taking only 4 days (~23rd March), indicating SARS-CoV-2 to be a highly transmissive type virus. By 30th March, the number of confirmed cases has shown an exponential spike to 7.25 lakhs across the globe. COVID-19 outbreak is the sixth PHEIC (public health emergency of international concern) following H1N1 (2009), polio (2014), Ebola (2014 in West Africa), Zika (2016), and Ebola (2019 in the Democratic Republic of Congo) [3]. India which is the second-largest population in

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the world having a rural-based and growing-urban developing economy is also suffering severely from this COVID-19. India reached its first 1 lakh infection on18th May 2020, and as of 11th of July crossed 8.5 lakhs.

COVID-19 not only killed people through virus incursion but also due to economic and mental collapse, where developing countries suffered from unemployment and hunger. India enforced 68 days of four-phased-lockdown starting from 24th March ~31st May to deal with COVID-19. However, in this current scenario of the COVID-19 period, what remains unanswered is whether the virus or the hunger is prepotent in India. Thus, how India is equipped to deal with, coping with the current situation, adverse effects on the economy, human living, and environment along with various approaches undertaken to overcome this pandemic is the topic of discussion in this work.

2. Indian scenario for COVID-19

2.1. How coronavirus spread to and in India

In the beginning, coronavirus cases in India happened due to the abroad connection rather than transmission within the country. The first three infection cases occurred on 30th January and 3rd February in Kerala as they returned from Wuhan China [8]. Within a month later on 3rd March, two more cases were reported where one patient had a travel history from Italy while the other in Hyderabad visited Dubai. On the very same day, few other cases were observed in Jaipur [9]. To control this spread, the Ministry of Health and Family Welfare (MoHFW) issued travel advisory restrictions which were similar to the previous pandemics such as SARS, Ebola, and bubonic plague, including the imposition of self-quarantine rules for 14 days to all international travellers entering the country. Additionally, travel visas were restricted until 15th April for other countries [10] and on 16th March 2020, MoHFW proposed various interventions such as social distancing of $\leq$ 1 m [11] to avoid/decrease the rate and extent of disease transmission in a community which eventually leads to decreasing in a spread, morbidity, and mortality due to the disease.

On 22nd March, Prime Minister Narendra Modi encouraged people to follow 14 h of Janata curfew in India [12]. On 24th March first phase of 21 days lockdown started in India [13]. Due to this lock down, mobility in grocery and pharmacy, recreation and retail, transit to station visits to parks, and workplaces reduced by 64.2%, −70.51%, −65.6%, −46.17 and −60.03% respectively [14]. Due to the growing number of infestation from COVID-19, on 14th April [15], Indian government declared an extended 2nd phase lockdown till 3rd May which was further lengthened till 17th May and later imposed till 31st May [14]. To make the lockdown and social distancing effective, India also levied the quarantine law under the Epidemic Disease Act, 1897. This 123-year-old legislation allows a state/country to inspect people traveling by railways, ships (air travel was not an option at that time when this law was created), and segregate suspects in hospitals, under temporary accommodations, or otherwise to prevent the spread of dangerous pandemic disease [16]. However, this is very trivial compared to North Korea's law where the military was imposed to enforce a quarantine [17,18].

Looking at the current trend in India, after the first confirmed case been reported on 30th January, the total number of confirmed patients reached 107 by 15th March, and since then, the number of positive cases is incessantly increasing. Within 15 days (15th to 30th March), confirmed cases of COVID-19 in India multiplied by 10 times. As of 30th March, India crossed more than 1071 cases with 29 deaths. Indian Council of Medical Research (ICMR) projected that India can reduce the cases by 62% if social distancing and proposed quarantine interventions are effectively executed. Another research revealed that India may corroborate nearly 13 lakh cases by mid-May if the spread of the virus is not contained, which however can be reduced with increased testing, obeying stringent measures, and implementing restrictions [19]. Nevertheless, in India COVID-19 cases reached 1,01,139 by 18th May. Initially, it was considered that India was dealing well with a low number of positive cases from COVID-19 because of the constricted transmission during a lockdown and social distancing [20], however, at the end of all lockdown phases, India experienced a total of 1,90,648 confirmed case including 5407 deaths due to this disease [21]. Cities like Ahmedabad, Bengaluru, Bhopal, Chennai, Delhi, Hyderabad, Indore, Jaipur, and Kolkata were identified as the COVID-19 hotspots with four major metropolitan cities accounted for nearly 40% of the COVID-19 cases in India [22]. It was speculated that the disease speeded in a higher number among children age $\leq$10 years and elder people diagnosed with other health issues [23]. Even though several researchers are now engaged to predict and estimate the COVID-19 cases and end of this pandemic [24–26], India is experiencing exponential growth in the number of COVID-19 cases. As of 11th July 2020, India is the 3rd most COVID-19 infected country with currently 2,922,58 active cases, along with 5,34, 620 patients being cured and discharged (recovery rate of 60.86%) followed by the demise of 22,674 COVID-19 infected patients. Fig. 1 shows the total infected cumulative cases in India till 11th July 2020. The active, cured/discharged, deaths and total confirmed cases have been tabulated in Table 1.

2.2. Approaches and measure

The clinical features of COVID-19 include fever (not in all), breathing difficulty, cough, lethargy, headache, myalgia, sore throat, and conjunctivitis (also in some cases). Hence, distinguishing this disease from other respiratory infections is relentlessly challenging [29,30]. Presently, no successful antiviral treatment or vaccine is available for COVID-19. Patients with severe acute respiratory infection, respiratory distress, hypoxemia, or shock demands immediate oxygen therapy. As a protective measure against COVID-19 transmission, WHO instructed certain practices like through and regular washing of hands using an alcohol-based hand sanitizer or soap and water, whilst outside avoid touching eyes, nose and mouth, circumvent distance traveling or crowd gathering and, encouraged breastfeeding babies to enhance immunity.

The Indian government (central and state level) is working intensely to minimalize the number of cases and consequences daily and is taking all necessary steps to combat the challenges and threat posed by this growing invisible pandemic war involving public, medical association, nurses, NGOs, police forces, including paramilitary. Earnest efforts of all the frontline workers especially medical doctors, nurses, healthcare staff, sanitation workers, police personnel, volunteers, and active support and obedience of people of India has been the only possible reason owing to the control and treatment of pandemic. Additionally, to treat/stop this COVID-19 infection there is a pressing need to handle this battle at a scientifically advanced level. Indian government got critically involved with the COVID-19 outbreak and started scanning every person. Currently, the testing facility includes Real-time PCR test, Point-of-Care molecular diagnostic assays, rapid antibody test (suitable for surveillance as the results come after 7–10 days of the pandemic infection) and point of care rapid antigen detection test for early detection of COVID-19 [31–36]. Starting from less than 100 tests per day, on 18th May India reached a 2,00,000 test landmark in its fight against COVID-19. This 2000 fold increase became achievable with cooperation from airlines, railways, medical colleges, ministries, postal services, research institutions, and testing laboratories. In January 2020, India had a single laboratory testing for COVID-19, at the Indian Council of Medical Research's National Institute of Virology, Pune and on 20th May 555 laboratories were set up across the country and currently, there are 1105 operational labs (788 govt labs and 317 private labs) to deal with COVID-19 cases [37]. Cumulatively 1,15,87,153 samples are tested so far and 2,80,151 as on 11th July 2020 [38]. Additionally, over 2.02 crore N95 masks and 1.18 crore PPE kits are distributed in Indian states and UTs for free since 1st April. India launched 'ArogyaSetu' mobile application for tracking the movements.

With no vaccine or antiviral drug available against SARS-CoV-2, Hydroxychloroquine (HCQ) is being advised as chemoprophylaxis drug

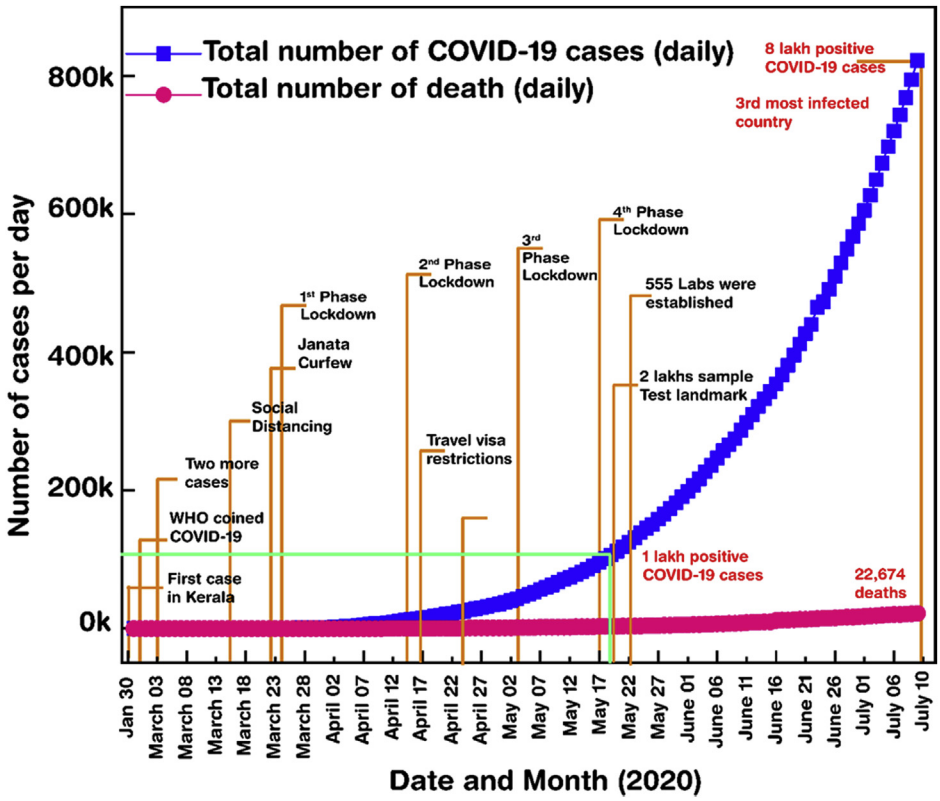

Fig. 1. Cumulative total COVID-19 cases in India till 11th July 2020 [27].

for asymptomatic healthcare personnel handling COVID-19 cases, frontline workers, and asymptomatic contacts of the confirmed cases while hydroxychloroquine-azithromycin combination is recommended for patients with serious sickness [39]. However, Indian Heart Rhythm Society recommends the use of HCQ as per the ICMR task force recommendations and strongly discourages its use for the general public without medical supervision and prescription [40]. Also, ICMR advised to conduct ECG palpitations, chest pain syncope) during the course of prophylaxis [41]. More than 6.12 crore HCQ tablets have been provided to states/UTs. Although the development and clinical trial of drugs is an ongoing process, the MoHFW, India stated that $\geq$1.5–2 years can be required for the development of a vaccine. Recently, Bharat Biotech International Ltd. in collaboration with ICMR – National Institute of Virology, Pune developed one COVID-19 vaccine. To investigate it more in-depth scrutiny, phase 1 and 2 clinical trials are permitted by the Drugs Controller General of India [42]. Even though the clinical trials of plasma therapy have been commenced by ICMR [43], the director general of ICMR advised that it's too early to give green signals for the success of this treatment as the number of patients involved in this treatment is still comparably insignificant. A drug can only be considered gold standard if the trial when conducted randomly shows a significant positive result from half of the tested patients treated using the experimental drug over the other half, not treated with the experimental drug [44].

Ministry of AYUSH made recommendations based on Ayurvedic literature and scientific publications for preventive measures and boosting immunity with special references to respiratory health. Medicinal plants such as Tinospora cordifolia (for chronic fever), Andrographis paniculate (for fever and cold), Cydonia oblonga Zizyphus jujube Cordia myxa (Antioxidant for immune-modulatory, anti-allergic, smooth muscle relaxant and anti-influenza activity), Arsenicum album 30 (for Effective against SARS-CoV-2, immune-modulator), Agastya Haritaki (Upper respiratory infections), Anuthaila, Adathodai Manapagu, Bryonia alba, Rhus toxico dendron, Atropa belladonna, Bignonia sempervirens, and Eupatorium perfoliatum because of their antiviral, anti-inflammatory and antioxidant properties, was considered and recommended to be favourable for the COVID-19 treatment and boosting immunity [45]. Ministry of AYUSH advised few health care measures and self-care guidelines for enhancing immunity (to fight against COVID-19) with ayurvedic procedures, like drinking warm water throughout the day, regular practice of Yogasana, Pranayama and meditation for at least 30 min, intake of spices like Haldi (Turmeric), Jeera (Cumin), Dhaniya (Coriander) and Lahsun (Garlic), drinking herbal tea/decoction (Kadha) made from Tulsi (Basil), Dalchini (Cinnamon), Kalimirch (Black pepper), Shunthi (Dry Ginger) and Munakka (Raisin) - once or twice a day, application of sesame/oil/coconut oil in the nostrils every morning/evening, oil pulling therapy, intake of chavanprash (10 gm/day), Golden Milk- Half teaspoon Haldi (turmeric) powder in 150 ml hot milk - once or twice a day, etc. Additionally, steam inhalation with fresh pudina, clove powder with honey can be taken to fight against dry cough/sore throat [46].

2.3. *Indian economy due to COVID-19 (negative)*

Indian economy, a developing market has already been in a crisis phase since last year when its economy reduced to 4.9% (in 2019) being the least since 2013. The primary reason for this downfall was Demonetisation in November 2016 which made 86% of the money in the economy unusable overnight [47]. This created a great negative impact on the growth of the industry e.g. demand for vehicles sale in India was low last year particularly the motorcycle which is a very attractive mode of transportation in rural India. Tourism is one of the most powerful sectors worldwide and India is no different. India ranked 34th among the 140 economies over the world in 2019. In 2018–2019 more than 10 million foreign tourists visited India and contributed an enormous amount into the Indian economy [48,49].

The day Prime Minister Narendra Modi first declared the 21 days of lockdown he also warned that this lockdown will have a negative economic impact and we have to pay the price for it. The All India Association of Industries (AIAI) estimated loss for Indian economy slated to be

Table 1
Total Covid-19 infections in different Indian states and Union Territories as of 1st July 2020 [28].

States	Active cases	Cured/ discharged	Deaths	Total confirmed cases
Andaman and Nicobar	47	50	0	97
Andhra Pradesh	7897	6511	187	14595
Arunachal Pradesh	128	62	1	191
Assam	2568	5647	12	8227
Bihar	2289	7687	67	10043
Chandigarh	70	364	6	440
Chhattisgarh	597	2250	13	2860
Dadra and Nagar Haveli Daman Diu	131	83	0	213
Delhi	26270	58348	2742	87360
Goa	716	596	3	1315
Gujrat	7049	23662	1846	32557
Haryana	4340	9972	236	14548
Himachal Pradesh	363	580	10	953
Jammu and Kashmir	2674	4722	101	7497
Jharkhand	591	1884	15	2490
Karnataka	7078	7918	246	15242
Kerala	2112	2306	24	4442
Ladakh	324	648	1	973
Madhya Pradesh	2626	10395	572	13593
Maharashtra	75995	90911	7855	174761
Manipur	681	553	0	1234
Meghalaya	9	42	1	52
Mizoram	38	122	0	160
Nagaland	291	168	0	459
Odisha	1851	5189	25	7065
Puducherry	430	272	12	714
Punjab	1557	3867	144	5568
Rajasthan	3381	14220	413	18014
Sikkim	37	52	0	89
Tamil Nadu	38892	50074	1201	90167
Telangana	8785	7294	260	16339
Tripura	301	1086	1	1388
Uttarakhand	609	2231	41	2881
Uttar Pradesh	6711	16084	697	23492
West Bengal	5761	12130	668	18559

$640 million with growth slated to be between 5 and 5.6% till 2022 [50,51]. After the first lockdown phase, within 7 days, electricity demand reduced to 30%, traffic in port became 5% less, oil demand lessened by 70%, and Indian rail activity was below 36% compared to last year [47]. The unemployment rate increased to 19% after a month of lockdown and overall unemployment was 26% across India by 24th April. Hence, the lockdown has a havoc impact on small, medium, and large enterprises of the country, which led to no job and economic downturn condition [52].

Swiggy and Zomato, two key food delivery players already started laying off the employees [53]. Previously they both used to handle over a million orders a day across more than 300 cities. The tourism sector also expected to have 70% job losses [54]. Likewise, India has an economy where a large section of people depends on the daily wages e.g. autorickshaw drivers, carpenters, delivery boys, domestic laborers, scrap or waste collectors, tea girls, vegetable vendors, and waiters. Unaware of the end to this pandemic COVID-19 and restricted lockdown scenarios, returning to its pre-lockdown stage will take time. For 2020, the tourism industry and air travel are expected to suffer greatly, and India's GDP growth is expected to decline ~2.5% from 5.3%.

However, complete lockdown in China can open a new place for the Indian economy as senior industrialists from India are hoping that India can be the new manufacturing hub for the world [55] nonetheless India needs to improve on the raw material sector otherwise this fact will not be a reality. India can take advantage particularly in the pharma industry, where India depends on 70% pharmaceutical ingredients [56]. Also, oil price reduced a lot from $68/barrel (on 3rd Jan) to $28.2/barrel (20th March) and India should take the advantages to buy them and store for future use as currently, the demand is low [57]. Even though there were huge economic losses due to lockdown but the government had no choice [58]. To stir up the economy Indian government is spending a $266 billion package which can improve 4% of the GDP [59]. These are a few measures but still not enough to reach India's previous growth of GDP.

2.4. Indian lifestyle, human life due to COVID-19 (negative)

Life in India includes urban and rural and they both got impacted by COVID-19. The disease in transmission was previously epicentre in all the major metro and capital cities of Indian states. However, both people from rural and urban sectors face a real traumatized situation. COVID-19 has created a negative impact on human life also. First to tame the COVID- 19 transmission, locked down and social distancing measure was taken. From 24th March, 1.3 billion people were in lockdown situations in India. Social distancing, advised in India, is difficult to follow for the urban poor who lives in slums or closed and small places. Mumbai (18.93° N, 72.83° E), the capital of Maharashtra state also known as the business centre of India is renowned for its large number of slums. It is estimated that 9 million people live in Mumbai slums where houses are fairly 10 ft by 10 ft and under such conditions obeying social distancing is a questionable issue [60]. In return, it can also be seen that in India number of COVID-19 cases are maximum in Maharashtra (37,136 cases by 20th May; 75995 cases by 1st July) and particularly high in the city [28]. In reality, social distancing is an oxymoron in such India's scenario [61].

Additionally, sudden lockdown enforcement on 24th March 2020, forced millions of migrant workers to undergo an uncertain future without family, food, and job. Usually, more than 50 million people migrated from Assam, Bihar, Madhya Pradesh, Odisha, Punjab, Rajasthan, Uttar Pradesh, and West Bengal to Maharashtra and Delhi for work. Due to lockdown, these people were forced to move out of their cities and return to their homes in the countryside [62]. In the absence of transport facilities, workers with infants, pregnant women, and the elderly were forced to walk on foot [63]. Hence, India experienced the second-largest reverse mass in its history after the Partition of India in 1947. Prominent psychosocial issues are expected among migrants for pandemic COVID-19 and lockdown [64,64,65].

Additional directives for workplaces like work from home (WfH) were advised in India which is however suitable only for urban upper- and middle-class people and is challenging for the rural agriculture-based population. Also, India still lacks places with the facility of computers and the internet, and hence these WfH is a challenge [66]. The Indian IT industry with primarily call-centres and knowledge process outsourcing were not ready for the lockdown and WfH situation [67]. However, a 60% hike of Wi-Fi network equipment, e.g. routers and mobile hotspot dongles demand were observed in India during the COVID-19 lockdown and WfH scenario causing a little boost up to the telecom industry.

Parallelly, the education system is also currently at a halt due to COVID-19 in India. During this lockdown period, the educational institutions were closed which hampered the overall teaching-learning process and education system due to the unavailability of online and computer systems among all the students in rural India owing to the disparity of economic condition. However, accessibility of android mobile and 4G connection, mobile phones in the urban sector of India [68], resulted in running schools online, where rural sections remained deprived of education.

Medical facilities faced critical time in India. Under the normal scenario, available beds per 10,000 people were 3.2 for rural and 11.9 for urban [69,70] which had to increase to accommodate COVID-19 patients. Because of the busy schedule for COVID-19 cases, some disruption and discrepancies were observed for the other treatments. Little difficulties occurred for running the children vaccination program for tuberculosis, meningitis, pneumonia, whooping cough, tetanus, hepatitis B, and diphtheria [71]. For adults, disruption of kidney dialysis, chemotherapy services were also noticed [72,73]. Tuberculosis (TB) still possesses the highest level of burden in India which generally occurs due to malnutrition associated with poverty. Lockdown cases had a great

increasing impact on the TB cases while they are also vulnerable to COVID-19 infection [74]. Nevertheless, to manage the COVID-19 cases, colleges, hotels, railway train coaches, were converted into quarantine facilities while stadiums were converted into isolation wards.

Isolation, fear, uncertainty, economic turmoil is namely a few issues that can greatly cause psychological distress among humans due to COVID-19 [75]. In India poverty, starvation, hunger is still an issue that will be escalated due to COVID-19. Mass unemployment is likely to create frustration and drive people to chronic stress, anxiety, depression, alcohol dependence, and self-harm. In the 2008 economic crisis, 10,000 "economic suicides" cases were reported across the US, Canada, and Europe, due to the financial crisis. For a country with the highest number of poor and malnourished, and individuals with depression and anxiety, India reported 1,34,516 suicides in 2018. Reportedly on 12th Feb 2020, a 50-year-old man diagnosed with a viral illness had a constant fear of getting infected by COVID-19 and this led him to commit suicide [76]. From 19th March to 2nd May, 338 deaths were reported due to lockdown which includes suicides arising due to fear from corona, self-isolation, starvation, and financial distress [77,78]. Further, suicide cases were registered for the reason of banning alcohol [79] during the lockdown period [80]. Impact of lockdown on orthopaedic surgeons in India (611 orthopaedic surgeons from 140 cities in India participated in this survey) was conducted and it was found that 22.5% of surgeons faced stressed while 40.5% faced mild stress [81]. Further staying at home during the lockdown, caused poor physical activity and unhealthy food habits which in turn generates weight gain, diabetes and increases the risk of developing cardiovascular disease [82,82,83,83].

Comparably some positive health issues were also observed. During the analysis performed using 100 registered patients from MV Hospital for Diabetes, Diabetes Research Centre, Chennai, it was observed that among 92% of the participants who have Type 2 diabetes, 80% of patients followed a routine lifestyle and controlled diet during the lockdown period while 40% of the participants were anxious for COVID-19 infection [84]. Another probably positive side of the lockdown is people are now staying home and have time for family, which is only legitimate with economically stable families [85].

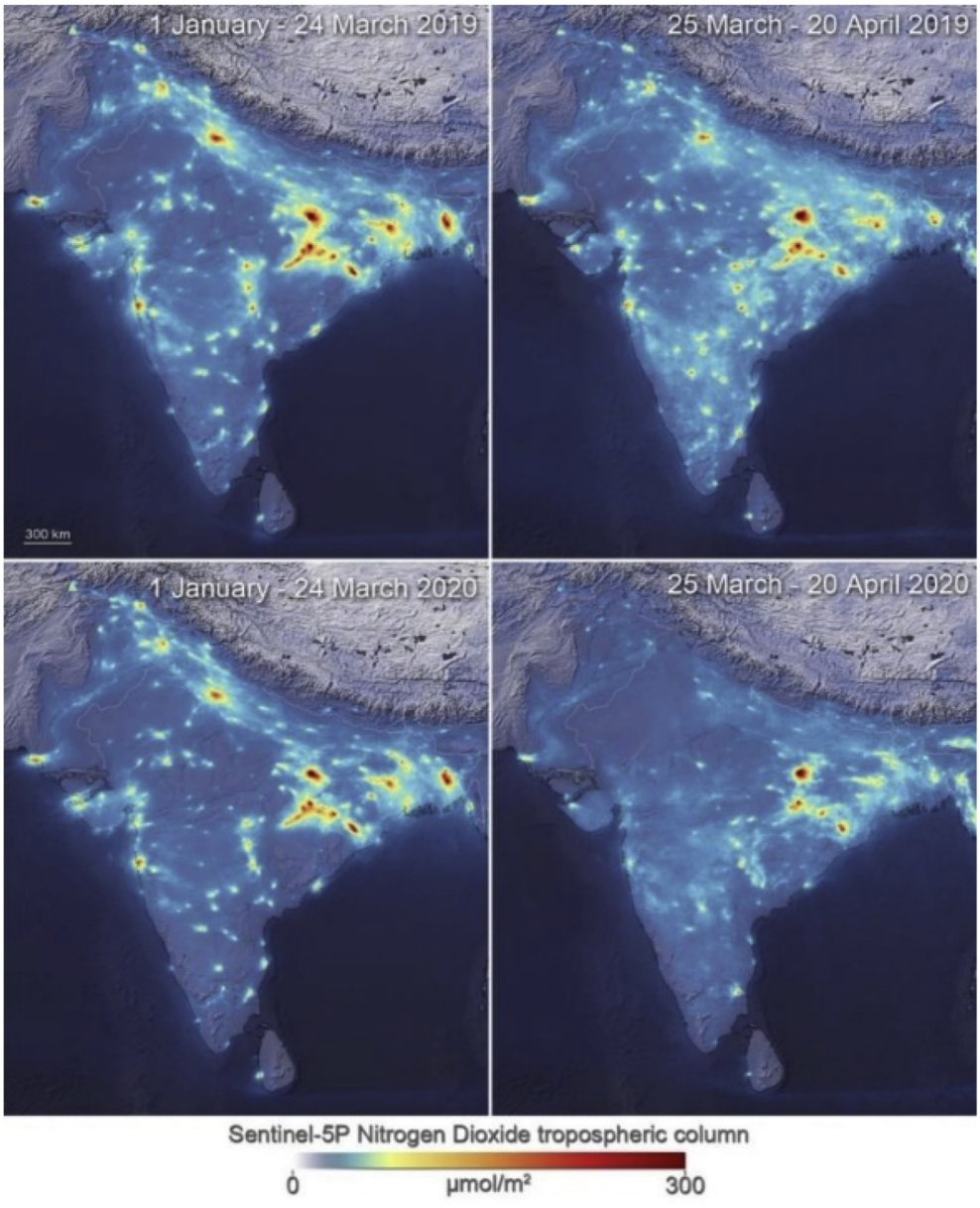

Fig. 2. Nitrogen dioxide emission before and after a lockdown in India [90].

2.5. Indian overall environment scenario (Positive)

Air pollution in India is severe and has an adverse impact on human health causing more than 3,50,000 new cases of childhood asthma and 16,000 premature death every year [86]. This is due to the presence of NO_2 and particulate matter in the range of 2.5–10 μm diameter in the air generated from fossil fuel burning and primarily from the transport sector in India. Due to lockdown, air flight, and every possible mode of transportation, along with industries, which are the primary sources of air pollution were ceased. Hence an improved air quality was visible [87,87,88,88].

Probably environment is the only sector that got an immensely positive impact form this COVID-19 scenario [89]. International energy agency reported that global coal use was 8% lower in the first quarter in 2020.

This Fig. 2 shows the Copernicus Sentinel-5P satellite of India before and after lock-down and also the previous year. A considerable amount of reduction in nitrogen dioxide concentrations reduction was observed. Delhi and Mumbai had a 40–50% NO_2 emission reduction compared to the previous year. The electricity consumption level declined by up to 9.2% while vital industrial states Tamil Nadu and Maharashtra faced a 5% reduction in electricity consumption during the end of March 2020. Several cities in Gujarat (Ahmedabad, Rajkot, Vadodara, and Surat) are equipped with power plants, transportation, outdoor waste incineration, construction, and brick kilns resulting poor air quality, also recorded a 30% power consumption decline due to lock-down [90,91] along with a 34–75% reduction of particulate matter, SO2, NO2, and CO, was between which enhanced the air quality index [92]. In India, coal-fired power generation was 15% less in March and 30% less in April [93]. Except for two units at Dadri Power Plant, all other coal-based power plants within a 300 km radius of Delhi (Haryana, Punjab, and Uttar Pradesh) were shut down due to low demand. Because of the locked down in March, total fossil fuel consumption reduced to 18% compared to last year's March [86]. The first phase-locked down showed that air quality particularly the reduction of NO_2. Delhi the capital of India which experienced air quality index up to 900, now air quality index below 20, because of the absence of 11 million registered cars from the road. The reduction of PM 2.5 was alarming in Delhi [94]. Dwarka river basin of Eastern India is highly polluted because of stone quarrying and crushing. During the lockdown period, it was found that the maximum PM10 concentration reduced from 278 μg/m3 (pre lockdown) to 50–60 μg/m3 after 18 days of the lockdown in that area. An improvement in the quality of the Yamuna river (concentrations of pH, EC, dissolved oxygen, biological oxygen demand, and chemical oxygen demand reduced by 1–10%, 33–66%, 51%, 45–90%, and 33–82% respectively) was also observed due to the shutting down of the Delhi-NCR industries, which mostly discharged the wastes and the toxic effluents into the river (vice-chairman of Delhi Jal Board Raghav Chadha. S) [95]. The surface temperature was reduced by 3–5 °C while the noise level dropped to <65dBA from above 85dBA [96]. Further, water quality of river Ganga was also improved during lockdown conditions [97]. Critically endangered, South Asian River Ganges Dolphins also were spotted back in the Ganga river after 30 years. Tens of thousands of flamingos have gathered in the city of Navi Mumbai. The birds normally migrate to the area every year, but residents have reported that this year they have seen a massive increase in their numbers. The Uttarakhand Pollution Control Board also reported that the Water from Har-ki-Pauri in Haridwar is 'fit for drinking after chlorination', which is due to the absence of industrial drainage waste into the river [98].

3. Discussion

India is still struggling and not sure when the peak will come. Researchers are involved to create theories and forecasting models [99,100]. It is certain that during the first phase of lockdown COVID-19 infected cases were under controlled [101]. Because of the population and population density lockdown was needed [102]. It should be mentioned that the People of India followed the Government prescribed rules and were knowledgeable about the drastic impact of COVID-19 hence tried to abide by the regulations [103,104]. Lockdown reduced the transmission and several countries got success from it. By the first week of March 2020, several countries like China, Italy, Spain, and Australia were fighting with the COVID-19 pandemic by taking strict measures like nationwide lockdown or by cordoning off the areas that were suspected of having risks of community spread [105].

India is currently facing dreadful impact from COVID-19 and due to its combined fear and lockdown scenario, a majority of Indians will face unemployment which will trigger them towards hunger issues, poverty, and mental illness. Even though it is still not clear whether coronavirus or hunger is prepotent to which Indians are exposed every day. So far it is clear that COVID-19 created a mixed impact on society including the economy, lifestyle, and environment. It is hard to imagine that the traumatic experiences of the COVID-19 pandemic will be forgotten quickly or disappear entirely over time. Lack of trust may grow between the citizen and the institution body. There is no space to celebrate or follow any model as there is a chance of the second wave.

There is a probable chance to have the second wave of COVID-19 and if that occurs India will suffer in huge from every aspect [106]. Previously in 2009, HIN1 influenzas flu and 1918 influenza pandemic both had the second wave, and that was more drastic than the first one [107]. In another study, it was predicted that India may see 2.87 lakh cases per day by the end of 2021 [108].

4. Conclusion

Thus, how India is the topic of discussion in this work. In this work, how India is equipped to deal with an increasing number of COVID-19 cases, coping with the current situation such as adverse effects on the economy, human living, and environment during the COVID-19 lockdown period along with various approaches undertaken to overcome this pandemic is discussed. Three segments were emphasized here: the economy, human life, and environment. It is evident that while the first two have a negative impact due to corona, the environment has an immensely positive impact. However, it's a big question for India that whether COVID-19 or hunger is the real issue now? As for the COVID-19 Indian economy is at a halt, thereby the unemployment number will be increasing in the future. Also, without proper vaccination, containing COVID-19 cases is a real challenge.

Authors contribution

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