ORIGINAL PAPER

Addressing the relevance of COVID–19 pandemic in nature and human socio-economic fate

Jyoti Thapliyal[1] · Malini Bhattacharyya[1] · Soban Prakash[1] · Babita Patni[4] · Sneha Gautam[3] · Alok Sagar Gautam[2]

Abstract

COVID-19 or Coronavirus (SARS-COV-2) is a pandemic calamity that has locked people in their own houses. The effect of SARS-COV-2 disease has caused a decrease in the economy as businesses, transportation, aviation, and industries have been halted. Many people have died, and many are trying to survive this pandemic. As we all know, the virus of SARS-COV-2 can be transmitted through physical contact, and the government has taken up specific measures like closing up schools and colleges, closing up malls/markets/public places, and imposing lockdown in cities. It is expected that these measures can result in a decreased infection rate. On the one hand, SARS-COV-2 Has halted economic or developmental growth, but on the other hand, our nature i. e. our earth, is being provided with such conditions that it can restore its losses. Air quality has been improved in the lock down time. The emission level of different gases and particulate matters have slowed down in the Covid period. Water bodies have been clean and more transparent and propagate wildlife and fisheries. Due to the SARS-COV-2 lockdown, businesses and industries have halted, impacting the financial needs of many people around the world. The worry about surviving this pandemic and the financial crisis leads them to mental and emotional distress. This review article summarized the emergence of SARS-COV-2 disease and its role on human physical and psychological health. We also described the positive and negative effects of SARS-COV-2 on climate, environmental, and air quality with upcoming challenges for governments and populations around the world.

✉ Babita Patni
  babita28paatni@gmail.com

✉ Sneha Gautam
  gautamsneha@gmail.com

✉ Alok Sagar Gautam
  phyalok@gmail.com

[1] Department of Environmental Plant Biology, HAPPRC, Srinagar, Uttarakhand, India

[2] Department of Physics, HNBGU, Srinagar, Uttarakhand, India

[3] Karunya Institute of Technology and Sciences, Deemed University, Karunya Nagar, Coimbatore, Tamil Nadu, India

[4] Department of Medicinal and Aromatic Plants, HNBGU, Srinagar, Uttarakhand, India

1 Introduction

The world nowadays raises voices by making global platforms to control environmental deterioration and climate change. Apart from that, people also raise voices for economic uncertainty, arising public health risks, and population burst. Many Environmental changes like ozone layer depletion, degradation of soil, pollution (air, water, soil, and noise) due to urbanization create an unmeasurable risk and damage to our planet. Environmental changes mentioned above is also harmful to human health and survival. The SARS-COV-2 pandemic imposes misfortunes in many countries (mainly in Italy, the USA, Spain, England, and India) across the globe. SARS-COV-2 is the greatest challenge to humankind after the 2nd world war (Gautam et al. 2022; Chakraborty and Maity 2020). That Coronavirus was once less known to humanity before developing

the disease in Wuhan city, China, in December 2019. Within five months of emergence, this disease had affected more than 210 countries worldwide (Viviane et al. 2021). SARS-COV-2 condition has stuck human socio-economic life. From sickness to death, worsening of physical health and mental health has exaggerated all parts of human life with the upsurges of SARS-COV-2 (Gautam et al. 2021a, b; Chelani and Gautam 2021; Wang et al. 2020). This disease is triggering a worldwide health emergency and driving economies to slow down because of the severe lockdown and safety protocols. The disturbance produced by SARS-COV-2 has jammed the environment in a challenging way. SARS-COV-2 is likely to impact millions of people's lives and the environment.

COVID-19, 'CO' stands for 'Corona' (which means crown like structure), 'VI' stands for 'virus,' and 'D' for disease, and 19 represents the year 2019, specifically the year of its occurrence (Chakraborty and Maity 2020). It is a single-stranded RNA (SS RNA) virus with 80–120 nm diameter. The 1st SARS-COV-2 infected patient was reported in Wuhan of Hubei province, China, in December 2019 (Travaglio et al. 2021). The Seafood market of Wuhan emerges as an initial infection source (Huang et al. 2020). World health organization (WHO) has classified SARS-COV-2 disease in the division of pandemic disease because it has infected millions of people across the globe since its occurrence (WHO 2020). Simultaneously, this virus has also crossed the continent barrier and species barrier. The initial scientific name for the COVID virus was 2019n-COV; it was changed to SARS-COV-2. It is related to different types of pneumonia: MERS-Middle East Respiratory Syndrome and SARS—Severe Acute Respiratory Syndrome. According to WHO, Respiratory infections can be transmitted through different-sized droplets. Respiratory droplets are > 5–10 μm and the droplet nuclei are < 5 μm in diameter in size. According to data and discoveries, the SARS-COV-2 virus is initially spread between the human population through direct contacts and droplets from respiratory routes (Chan et al. 2020).

When a healthy person comes in contact with an infected person (within 1 m), the chance of occurrence of symptoms of SARS-COV-2 is very high because there is a chance of exposure of having infected person's nose and mouth or conjunctiva (eyes) to other people (Liu et al. 2020; WHO 2020). The local transmission stage of SARS-COV-2 transmission occurs when the virus is transmitted between the family members. Community transmission is when the SARS-COV-2 virus is transmitted in the neighborhood and a particular area (Figs. 1, 2). According to the report of WHO, this outbreak has infected 216,229,741people, including 4,496,681 deaths across the globe as of 30 August 2021 (WHO 2014, 2021) (Fig. 3).

2 Effect of COVID-19 on human health

The concept of global health, in the meantime, specifies the delicate balance between environment and human health (Gollakota et al. 2021; Gautam and Hens 2020a, b). Ecological changes significantly impact human life and health (Tolu Oni 2020).

In the last few months, the coronavirus genome in humans has been investigated. Studies suggest bats are probably the reservoir (Chakraborty and Maity 2020). The new Coronavirus latches itself on the healthy cells, mainly in the lungs. Its spiky surface protein adheres to the lung ACE2 receptors cells. After piercing the cell surface, it infects the healthy cells and damages them. The sickness produced by the Coronavirus starts with an infected person's cough, breath, and sneeze. These droplets could persist in the air. The transmission of the virus may occur if somebody touches the infected surface before touching the eyes, nose, and mouth. In this route, the virus enters the mucosal membrane of the throat. As the virus enters the respiratory tract, the chances of causing severe sickness are high because the lower respiratory tract has more ACE 2 receptors. The SARS-COV-2 symptoms primarily show as fever and cough. More than 8 in 10 cases are with mild symptoms. After five to eight days, symptoms like shortness of breath lead to acute respiratory distress syndrome (ARDS) in the next few days. The living condition and environment of the host can make him vulnerable to SARS-COV-2 infection Conditions like uneven access to safe housing upsurges the contact of indoor and outdoor air pollution, and moist conditions may escalate the chances of getting heart and respiratory disease (Masih et al. 2019).

Even if the influence of this epidemic on mental health is not recorded and measured, some clues and data may be obtained from the previous pandemic or epidemic infections knowledge. Countries belonging to 1st world countries and low-income countries are suffering from this disease (Fig. 3). The SARS-COV-2 pandemic threatens our population and human life, posing a danger to humans' emotional and mental well-being (Chakraborty and Maity 2020).

Apart from vaccination and medication, social distancing is also significant to stop SARS-COV-2. Several countries worldwide applied several social distancing methods in the form of lockdown. Table 1 below elaborately describes several types of social distancing processes to isolate Coronavirus infected people from others and stop the spread of the disease.

Global warming is responsible for degrading air quality. Global warming is the leading reason for climate change. Global temperature increases because of the rising of CO_2 concentration, water vapor, and other GHGs (Greenhouse
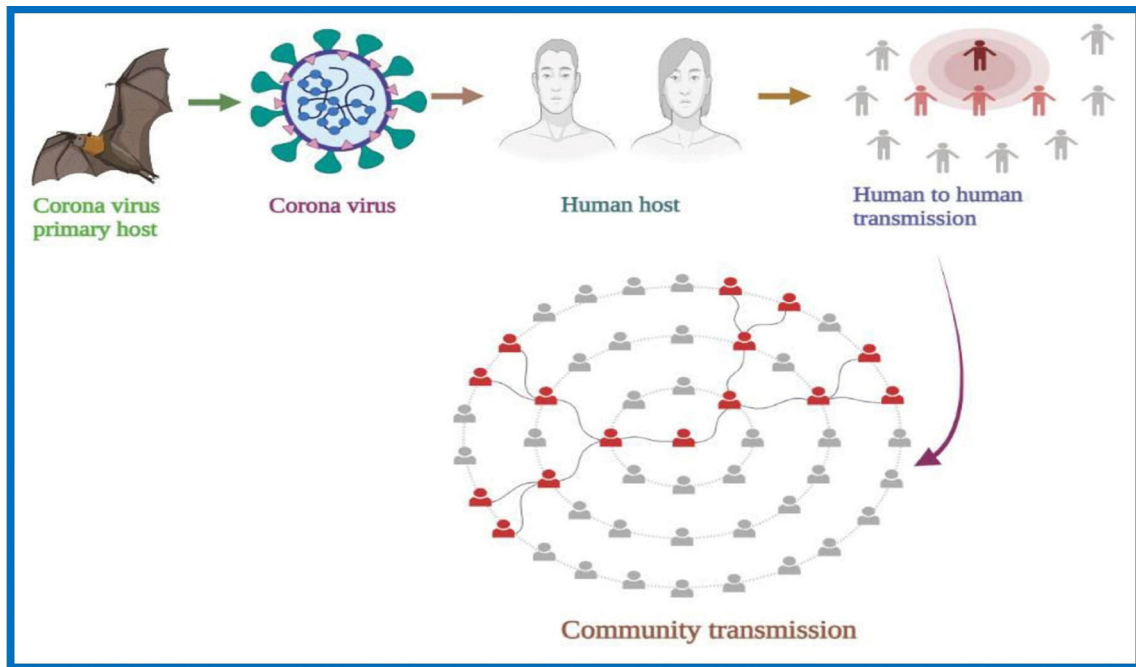
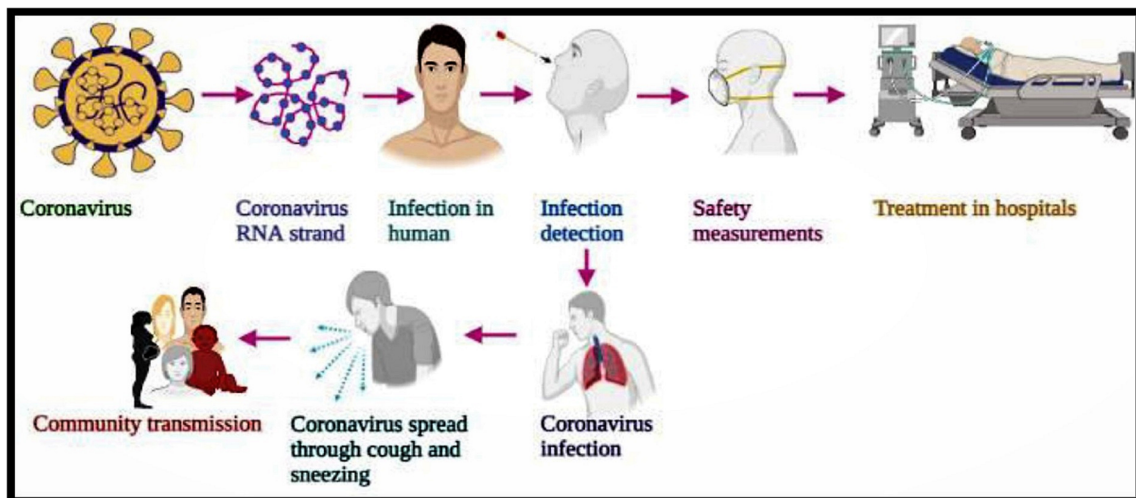Fig. 1 Modes of transmission (Shereen et al. 2020)

Fig. 2 COVID-19: Transmission and infection

gases) coming from fossil fuel burning and several anthropogenic activities (Sharma et al. 2021; Ambade et al. 2021; Gautam et al. 2019a, b). GHGs trap sunlight energy in the form of short waves and release it in a long wavelength. This phenomenon increases the temperature of our planet. Since 1970, around 90% of sunlight energy has been absorbed by the ocean. GHGs are Carbon dioxide (CO_2), Chloro Fluro carbon (CFC), Methane (CH_4), Nitrous oxide (N_2O), etc.

This paper aims to catalog the impact of SARS-COV-2 in purifying air quality thoroughly, human health, and wealth. SARS-COV-2 has created lockdown in many parts of the world. This lockdown phenomenon has postponed many anthropogenic and industrialization phenomena, subsequently lowering air pollution. This paper has thoroughly demonstrated the effect of lockdown on air pollution and climate change. Apart from that, lockdown also leaves an impact on human society. Just for lockdown and several social distancing quarantine criteria, the GDP of many countries has degraded. Loss of economy and joblessness has created many mental issues. This review article also documented the effect of SARS-COV-2 related lockdown in human mental health and the economy.

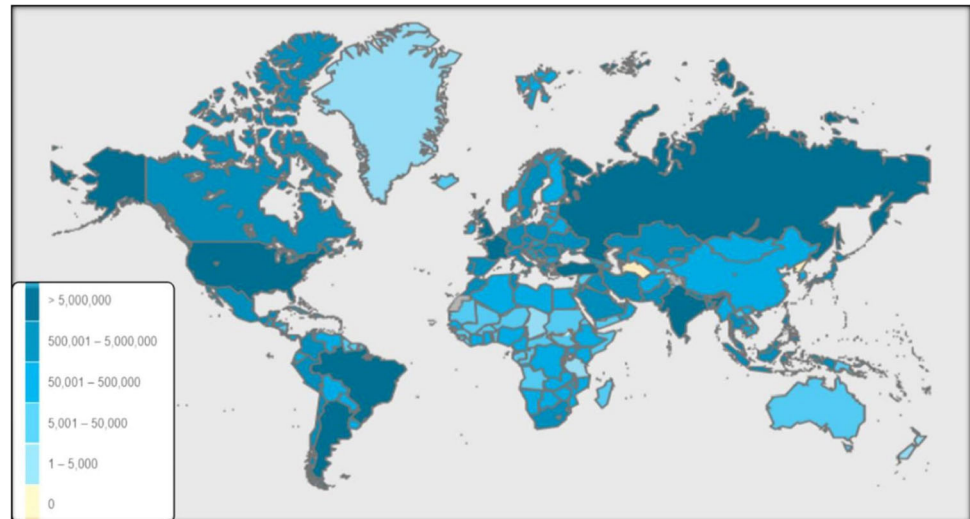**Fig. 3** Global COVID situation as of 15 August, 2021, 6.47 PM according to WHO (Source: https://covid19.who.int/)

Table 1 Specifications of lockdown periods

Social distancing types	Period	Countries involved	Guidelines for public	Government actions	References
Stringent lockdown	Mostly after March 2020–July 2020	Several European countries, India, Korea	Delay or cancellation of unnecessary gathering, travel, and shopping, visiting doctors, hospitals, and banks	Halted many operations, instructed people to seat between safe distances in public transports, Hajj, Umrah, and the Olympic had been suspended, Flight, railway services (except goods train), bus, trucks, vehicle transports were suspended	Chakraborty and Maity (2020), Choi et al. (2020)
Relaxed lockdown	Mostly after July 2020–Oct 2020, March–2021–July 2021	Several European countries, India, Korea	Limited transports, Shops opened for a limited period	To maintain personal hygiene, to maintain social distancing, wearing masks and vaccination	Choi et al. (2020)
Unlock phase	Mainly after July 2020–till the spread of the said disease again	Europe, the Asian continent	All necessities open for a limited period, online modes are mostly chosen for education, online	All facilities gradually open with many terms and conditions	Choi et al. (2020)

3 Materials and methods

Our objective is to understand the subsequent two years long lockdown effect in the environmental pollution level, human mental health, and in the socio- economic conditions. To document the objective mentioned above, we have searched different research databases by using different parameters like, "effect of COVID–19 in air quality"; "effect of COVID–19 in human health" and "effect of COVID–19 in socioeconomic conditions". We have searched in Scopus (www.scopus.com), Research gate (https://www.researchgate.net/), Pubmed (https://pubmed.ncbi.nlm.nih.gov/about/), Academia edu (https://www.academia.edu/), and also in normal google search also (Table 2).

4 Result and discussion

After searching literatures from the said research databases, we got a clear view about the present scenario. The novelty and relevance of this paper is to identify the possible pros and cons of lockdown. Air quality becomes better comparison to pre lockdown times. This is the positive part of lockdown. But in this lockdown, many people all over the world suffered from different psychological problems.

Table 2 Data showing greenhouse gases (GHGs) their sources, average and expected atmospheric concentrations and their potentiality in global warming (**after** tkemaladze and makhashvili 2016)

Greenhouse gas (GHGs)	Symbol	Major sources	Global warming potential (gwp) in 100 years	Mean atmospheric concentration present (in parts per billion-ppb)	Expected concentration by 2030 (in parts per billion-ppb)
Carbon–dioxide	CO2	Burning of Fossil fuels	1	350,000	500,000
Methane	CH4	Fossil fuel production	21	1700	2300
Nitrous oxide	N2O	Fertilization, burning biomass	310	0.001–50	0.001–50
Chloro–fluro-carbon	CFC	Aerosol sprays, Refrigerants	1500–8100	3	2.4–6

These psychological problems may lead to the occurrence of a new pandemic. The detailed discussion is given below:

4.1 Effect of SARS-COV-2 on air quality

Due to SARS-COV-2 pandemic, governments across the globe have applied strict rules and social distancing measurements. This leads to quarantines, work from home, extensive travel restrictions, and closing off the industries, businesses, and transport networks. This action creates a change in air quality and lowers air pollution. Decrease in the emission of CO_2 and lessened human activities have led to improved air quality. As aviation, industries, and other means of transportation stop, air pollution is reduced in countries like China, Italy, and Spain, as these countries are severely affected by the virus. The reduction of carbon emission policies like work from home has played an important role. According to the Centre for Research on Energy and Clean Air report, in China, CO_2 emission falls 25% at the start of the year due to the lockdown and travel bans (Jeff, 2020) (Fig. 4).

A few days after the lockdown, the pollution levels in cities around the country plummeted. This sparked a debate about whether lockdowns are an effective alternative for reducing air pollution. Anthropogenic (human-made) aerosols contribute to hazardous levels of air pollution in several Indian cities every year in India's cities. Aerosols are heterogeneous chemical particles suspended in liquid, solid, or mixed suspension. As the name suggests, aerosols are a colloidal system consisting of liquid or solid particles floating in a highly gaseous medium. In addition, aerosols decrease vision and can harm the lungs and heart of humans. In terms of aerodynamic diameter, atmospheric aerosols range from 1 nm to over 100 m, or five orders of magnitude. Fine aerosols are defined as those with a diameter of fewer than 100 nm (nm), whereas coarse aerosols have a diameter of 0.1–1 μm (m) or greater. For example, in virgin marine habitats, the number of aerosol concentrations ranges from 100 to 100,000 cm-3 (Poschl 2005). For example, inorganic ions (primarily ammonium, sulfate, and ammonium) and mineral dust from geological sources, as well as abrasion products such automotive liner pieces and sea salt (Fuzzi et al. 2015) (Fig. 4). This aerosol contains living bacteria and viruses and pollen, and non-viable plant detritus as its biological origins (Gautam and Trivedi 2020; Humbal et al. 2019, 2018; Viviane et al. 2012). The physical and chemical characteristics of aerosol can vary greatly depending on the source of the particles. Chemical substances oxidize and react in the atmosphere to generate aerosol particles (Horvath 2005). (Figs. 5, 6). Table 3 given below describes different types of primary biological aerosols.

Satellite images from the European space agency show a reduction in the level of NO_2 that causes respiratory problems as countries lockdown and restrict travel (Warland 2020). In India, during COVID lockdown decrease in industrial activities and reduction in the movements of the car buses, trucks, and flights leads to the decrease in aerosol levels in the air. NASA satellite sensors observed aerosol levels at a 20-year low in northern India for this time of year (Fig. 5).

In the urban region, human activity like road transportation is the primary source of the emission of NO_2 (Bisht et al. 2022). Human sources of NO_2 are planes, ships, and power plants that use fossil fuels. Given this, it's surprising that levels of NO_2 have decreased notably in the urban region during the global lockdowns, especially in India's densely inhabited cities. According to a report by the European Space Agency (ESA), a notable decline in the rate of NO_2 (around 40 to 50%) has been witnessed in Mumbai and Delhi compared to the same period last year
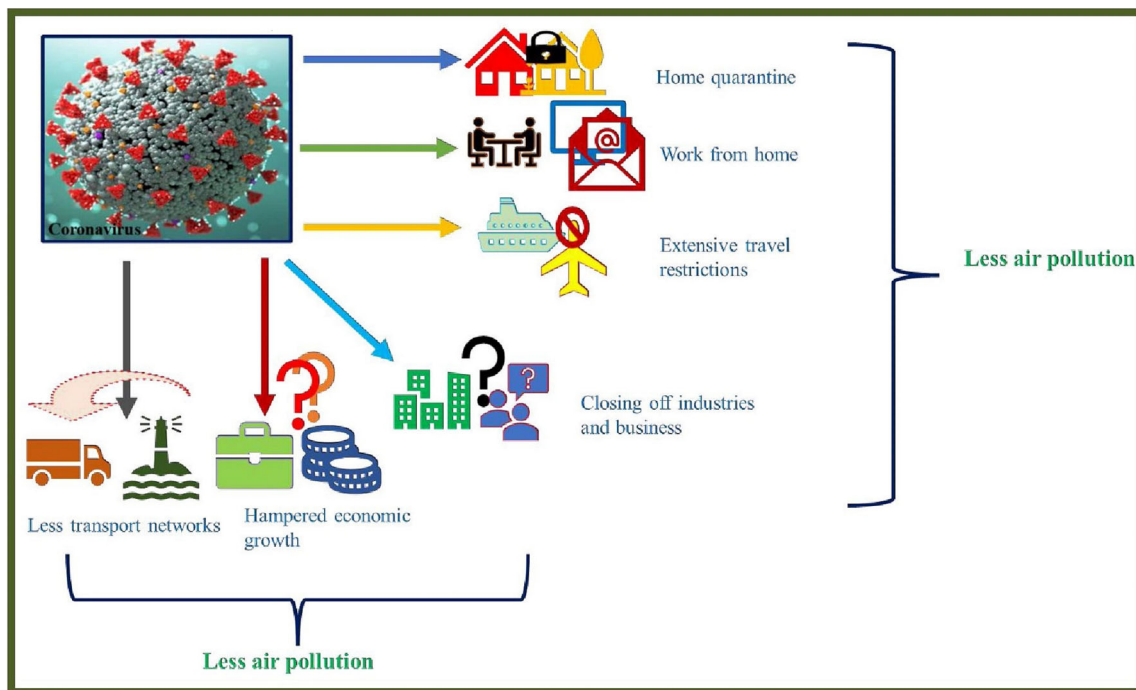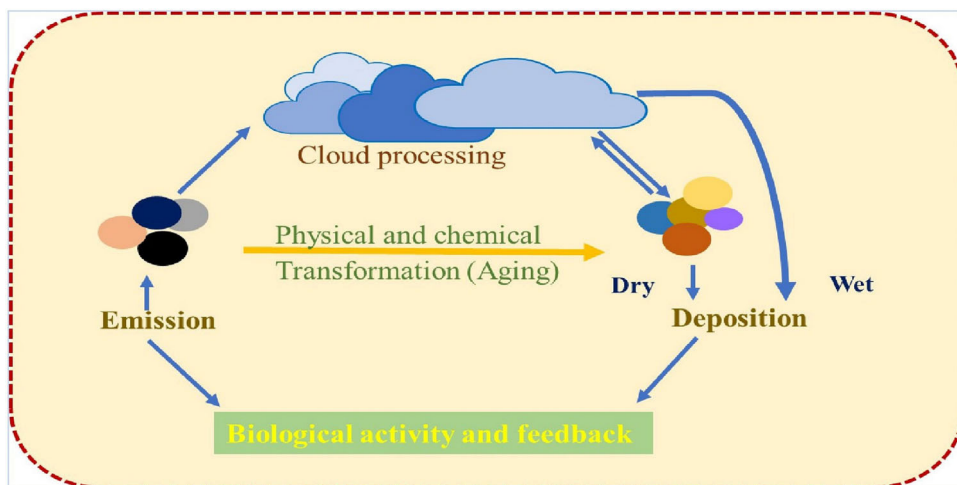
Fig. 4 Indirect effects of COVID 19 leads to truncated air pollution

Fig. 5 Biological activities of aerosol particles

(Fig. 6A). France and Italy have also experienced the reduction of air pollution (Figs. 7, 8, 9, 10).

4.2 The positive impact of SARS-COV-2 on air quality

SARS-COV-2 or Coronavirus has locked up people in their own houses. Man's actions have generated a significant factor in pollution, which disturbs the fragile balance among the various living beings. For his greed, human has ruined natural resources and polluted land, water, and air. Human activities have destroyed its surrounding environment, causing pollution, leading to climatic shift, depletion of the ozone layer, decrease in the level of groundwater, global warming, variation in the ecosystem, and biodiversity (Bremer et al. 2019). The effect of lockdown can be seen in a reduced measurement of global warming. Global warming is caused by three major greenhouse gases (CO_2, NO_2, and CH_4) (Jauregui 2020). The emission of CO_2 and NO_2 is reduced due to the halt in the industrial and tourism sectors, coal-fired power plants, and motor vehicles, which reduce the number of greenhouse gases in the environment. SARS-COV-2 lockdown, the lack of tourists has caused a notable change in the beaches and water bodies around the world. Beaches like Barcelona (Spain), Salinas (Ecuador), and Acapulco (Mexico) now have crystal-clear water
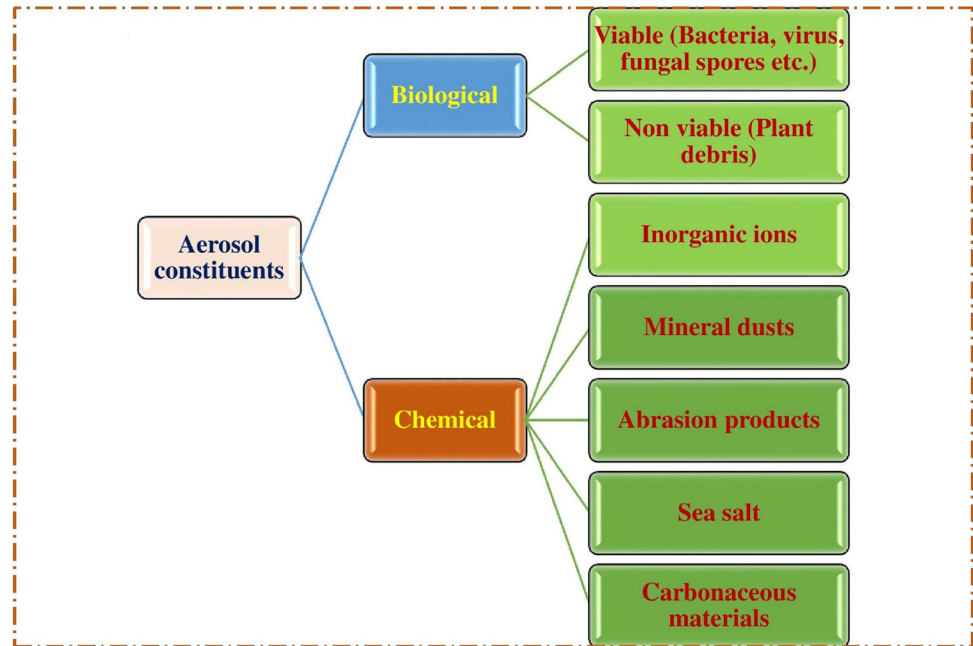
Fig. 6 Different constituents of aerosol

Table 3 Major types of biological aerosols (Viviane et al. 2012)

Serial number	Particle types	Examples
1	Biological organisms	Bacteria (*Bacillus subtilis, Pseudomonas fluorescens Pseudomonas syringae, Pseudomonas antarctica, Pseudomonas viridiflava, Pantoea agglomerans, Enterobacter agglomeransor, Escherichia coli, Erwinia herbicola, Erwinia carotovora*) fungi (*Cladosporium cladosporioides, Cladosporium herbarum, Penicillium chrysogenum, Penicillium brevicompactum, Penicillium digitatum, Penicillium frequentes, Aspergillus versicolor, Penicillium minioluteum, Penicillium notatum, Aspergillus flavus, Fusarium oxysporum, Aspergillus fumigates, Paecilomyces variotii, Fusarium avanaceum, Fusarium acuminatum, Fusarium tricinctum, Microascus brevicaulis, Rhizopus stolonifera*), protozoa, algae, spores, lichen, archaea (*Ochromonus danica*) and viruses
2	Solid fragments	Detritus, microbial fragments, plant debris, leaf litter, and animal tissues, etc

(Zambrano Monserrate and Ruano 2020). In Venice, cleared water flow and visibility of the fishes can be seen in the canals. The official statements made by the Venice mayor's office stated that the reduction in air pollution along the canals and sedimentation of soil and dust particles in water that is disrupted by boats leads to the clarity of the water (Srikanth 2020). Central Pollution Control Board (CPCB), India, analyzed the real-time water monitoring data during the lockdown and concluded that the average water quality of Ganga has improved during the lockdown, which was favorable for breeding fisheries (McMahon 2020; Sehgal 2020).

A case study in South Korea revealed the reduced level of PM $_{2.5}$, PM $_{10}$, CO, and NO$_2$. According to a study, March 2020. Table 4 has documented the year-on-year comparison of March month air pollution data. Table 4

data has revealed March 2020 has the lowest level of air pollution.

Any elevated level of sound which harms human beings and the environment is defined as noise pollution. These elevated sounds could be generated by manufacturing activities such as industrial or commercial noise, vehicles transportation, and high-volume music. Noise pollution is the leading cause of uneasiness for living beings and the environment, which causes health problems, alters the natural settings of the environment, and behavioral and health problems (Zambrano Monserrate and Ruano 2019). Due to the lockdown, private and public transportation use has halted, and other commercial and industrial activities are stopped, significantly lowering noise pollution.
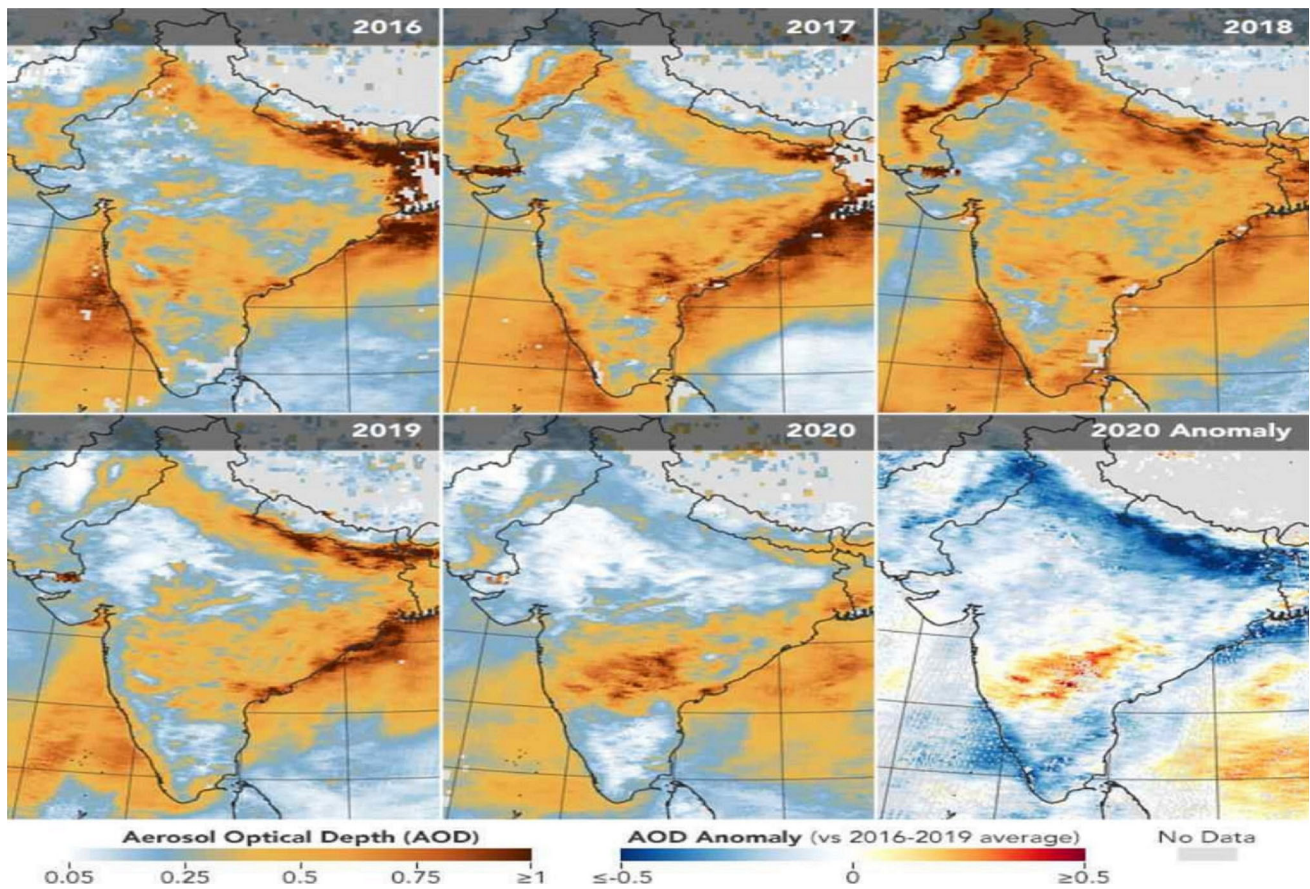
Fig. 7 Comparative maps showing the aerosol optical depth measurement over India from 2016 to 2020 according to NASA Earth Observatory 2020. (https://earthobservatory.nasa.gov/global-maps)

4.3 The negative impact of SARS-COV-2 on the environment and society

There is some negative impact also has been seen on the environment, society and air quality. Environmental issues like deforestation, erosion of soil, water, and air pollution are indirectly caused by the generation of inorganic and organic wastes. (Morad et al. 2016). During COVID-19 pandemic, the immense need for disposable medical items such as single-use gloves, surgical masks, and empty IV bags has created a cataclysm of medical garbage. Massive amounts of empty IV bag disposable masks and gloves worn by health workers were sanitized and then were incinerated or went to the disposal area. At the time of the SARS-COV-2 outbreak, an average of 240 metric tons of medical waste per day was generated in Wuhan hospital. In other countries like the USA, garbage from personal protective equipment such as masks and gloves has been increased at a very high number (Calma 2020).

In recent days, the unemployment rate has increased due to the shutdown of local businesses and industries. It has caused significant distress among the people who have lost their jobs and way of earning. It is unavoidable that this global pandemic has generated an increase in the rate of unemployment associated with the financial dilemma and will have a consequent impact on the behavioral aspect of human society. Beyond the adverse effects of an economic plunge, SARS-COV-2 also impacts the people's collective psyche, which leads to the fear of the virus itself, extended physical distancing, anguish, and related communal desolation (Paul and Moser 2009). Due to lockdown, rail services (except goods trains) and vehicle transportation are postponed with an exception to those associated with essential and necessary items. In SARS-COV-2 afflicted countries, commercial, academic, sacred institutions, and sports facilities are shut down. In many countries, an extended lockdown has affected the industries because they have been closed for a long time. The tourism and transportation industry are also facing absolute hardship. The manufacturing level has also decreased (Chakraborty and Maity 2020).

People who are directly impacted and their careers are likely to feel the effects of a mental health crisis. After the 2003 severe acute respiratory syndrome pandemic, 65-year-olds committed suicide at a 30% higher rate; about 50% of the recovered patients remained worried; and 29%
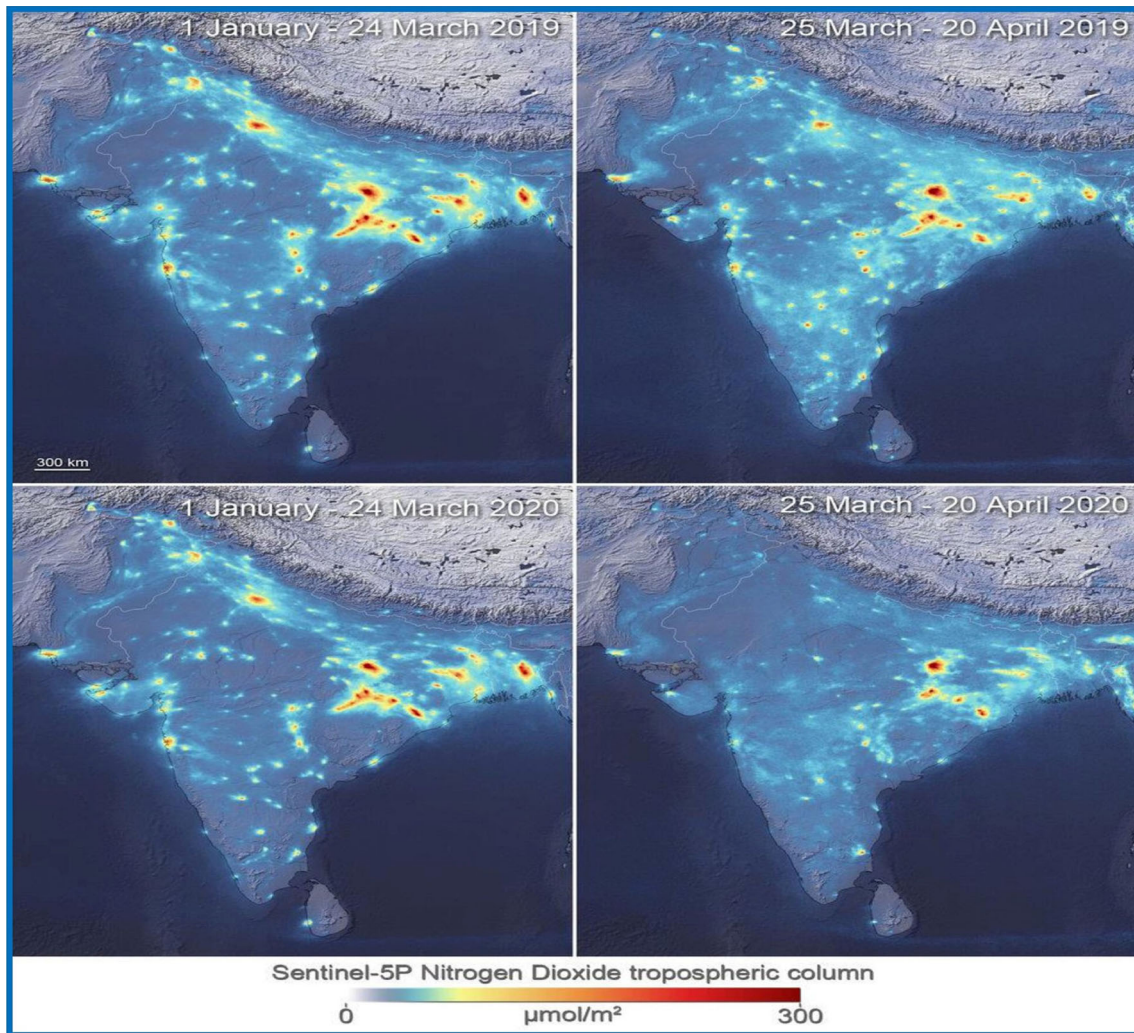
Fig. 8 Comparative Nitrogen dioxide concentration degradation assay in India during lockdown period 2020. (https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Sentinel-5P/Air_pollution_drops_in_India_following_lockdown)

of healthcare professionals suffered evident mental pain (Yip et al. 2010). As mentioned above, quarantine and the social and physical separation measures that accompany it have the potential to cause mental health difficulties. The list includes suicide and self-injury, alcohol and drug abuse, child and domestic abuse, gambling, and psychosocial risks (including social detachment, entrapment, cyberbullying, feeling as if you're a burden and being unemployed, unhappy in relationships, and homeless) (O'Connor and colleagues 2014). Anxiety, depression, suicide, and self-harm attempts are expected to grow as a result of the SARS-COV-2 epidemic, as well as more excellent social isolation (Turecki et al. 2019). Cyberbullying was wary of its coordinated resistance during the epidemic. There will be stress, monetary disputes, and overall uncertainty this time around, which will lead to a behavioral health issue (Coe and Enamoto 2020) (Figs. 11, 12).

5 Discussion

The effect of SARS-COV-2 has caused a decrease in the economy as businesses, transportation, aviation, and industries have been halted. Many people have died, and many people are trying to survive this pandemic with fear. As we all know, the SARS-COV-2 can be infected through physical contact, the government has taken up certain measures like closing up schools and colleges, closing up malls/markets/public places, and imposing lockdown in cities. It is expected that these measures can result in a decreased rate of infection (Chakraborty and Maity 2020; Gautam et al. 2021c; Nepolian et al. 2021). On the one hand, SARS-COV-2 has halted economic or developmental growth, but on the other hand, our nature i. e. our earth, is being provided with such conditions that it can restore its losses. Due to the lockdown, air quality has been improved as the emission level of different gases has slowed down.
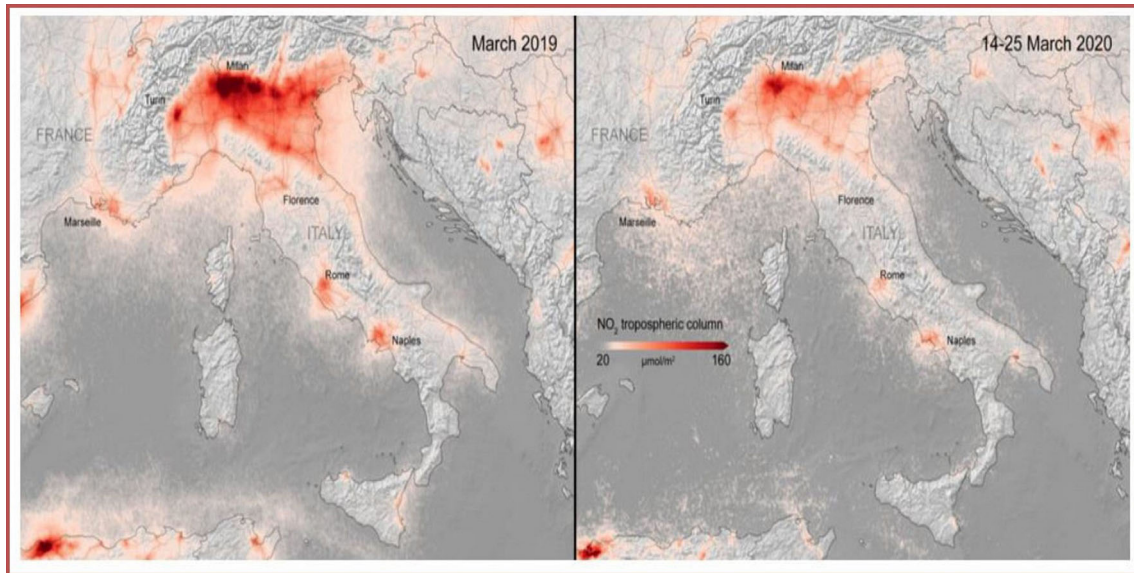
Fig. 9 Comparative Nitrogen dioxide concentration degradation assay in France during lockdown period 2020 (https://metro.co.uk/2020/03/30/coronavirus-lockdown-effect-europes-air-pollution-12477251/)
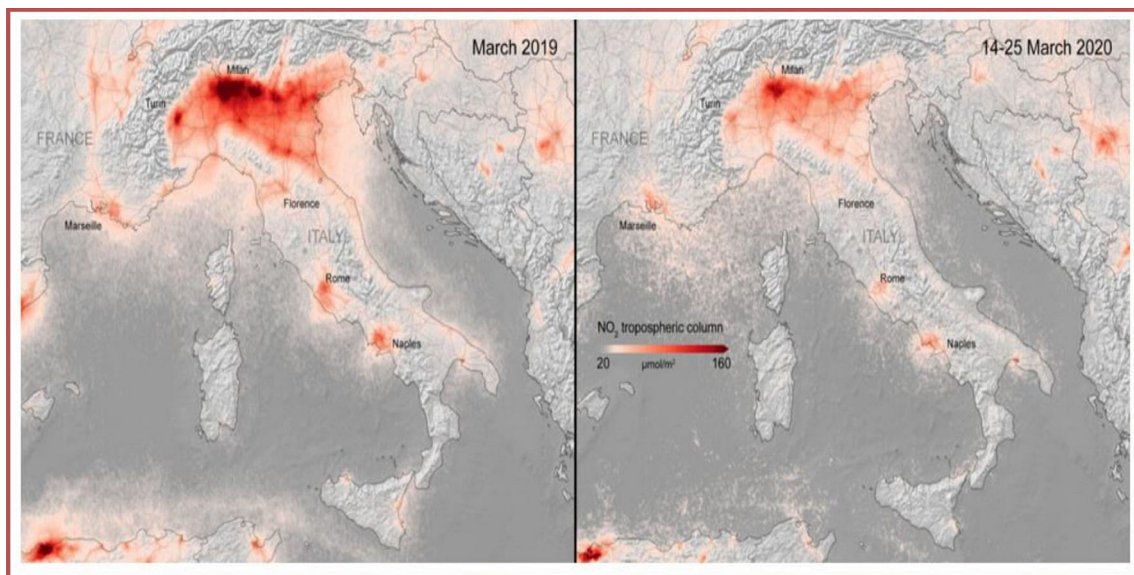

Fig. 10 Comparative Nitrogen dioxide concentration degradation assay in Italy during lockdown period 2020 (https://metro.co.uk/2020/03/30/coronavirus-lockdown-effect-europes-air-pollution-12477251/)

Table 4 A case study report based on air pollution formed by greenhouse gases of four subsequent years	Year	2017 (March)	2018 (March)	2019 (March)	2020 (March)
	$PM_{2.5}$ ($\mu g/m^3$)	34.23 ± 9.72	28.65 ± 15.54	37.37 ± 23.95	20.39 ± 6.31
	PM_{10} ($\mu g/m^3$)	54.67 ± 11.87	46.73 ± 21.71	60.77 ± 31.05	39.16 ± 7.23
	NO_2 ($\mu g/m^3$)	23.61 ± 6.16	20.31 ± 5.26	20.38 ± 6.63	16.22 ± 4.95
	CO ($\mu g/m^3$)	0.536 ± 0.074	0.495 ± 0.093	0.513 ± 0.134	0.387 ± 0.040

Water bodies have been clean and more precise and able to propagate wildlife and fisheries. Due to the SARS-COV-2 lockdown, businesses and industries have halted, which is impacting the financial needs of many people around the world. The worry about surviving this pandemic and the financial crisis leads them to mental and emotional distress.
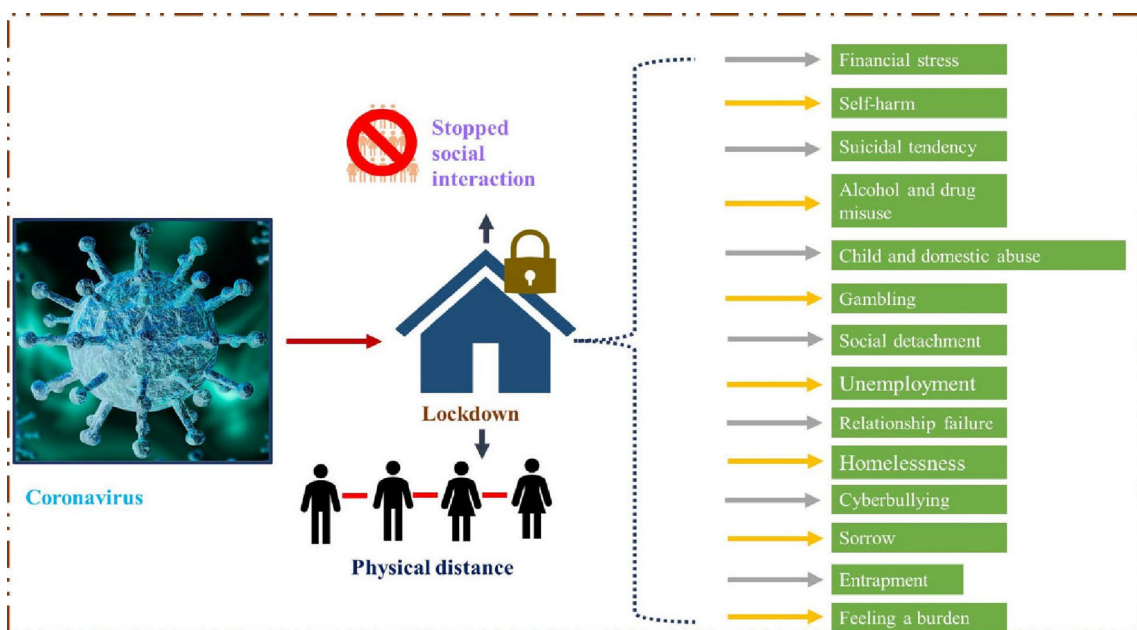
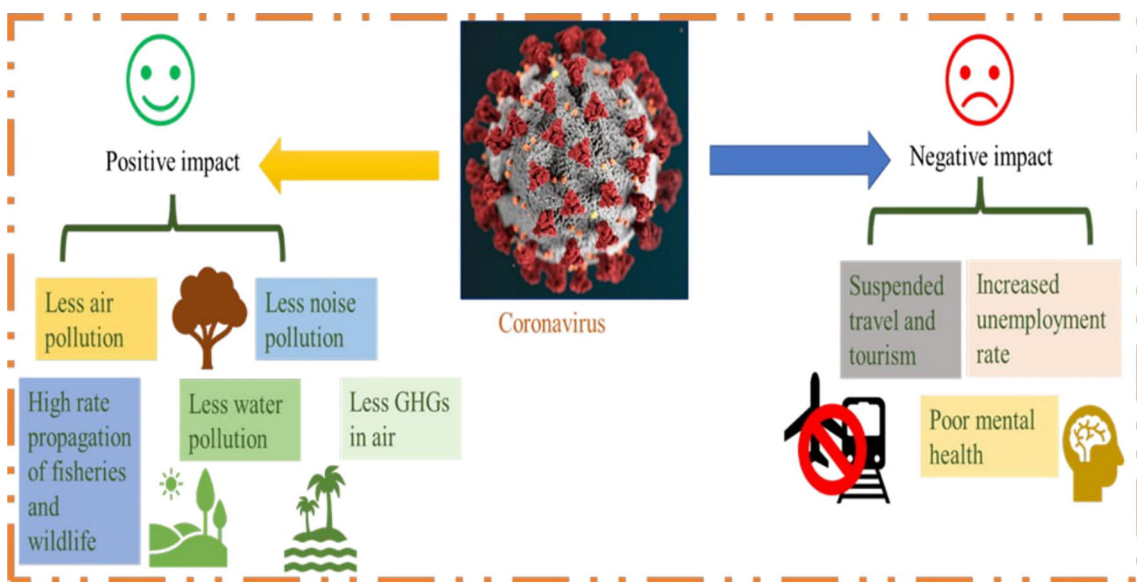**Fig. 11** Emotional imbalance during COVID 19

Fig. 12 Positive and negative impacts of COVID 19

This article summarizes the emergence of SARS-COV-2 and its effect on human physical and mental health (Matthews et al. 2019; McMahon 2020). We also describe the positive and negative impacts of SARS-COV-2 on climate, environment, and air quality with upcoming challenges for governments and populations around the world.

The safety measurements like movement restrictions, quarantine, lockdown, social distancing, and other protocols are reported for the improvement of environmental quality. Ozone and NO2 concentrations have dropped considerably below acceptable levels for air quality,

according to real-time data. Pollutants in the air are mostly produced by traffic and industrial emissions. As a result, a lockdown is arguably the most effective approach to minimize air pollution in a given situation. Many air pollution species will be reduced by 2020 as a result of the shutdown (Chen et al. 2020). Many countries have seen a considerable decline in ambient air pollution. However, ambient PM 2.5 levels remain hazardous and over the threshold for causing health problems (Chen et al. 2020; Sarkodie and Owusu 2020). According to our study and others (Wang et al. 2020), the reduction in ambient PM 2.5

concentrations is related to deterioration in nitrogen dioxide and ozone concentrations in several countries. Aside from this fact, high-income nations have lower levels of ambient PM 2.5 pollution. In low-income nations such as Pakistan, Bangladesh, Uganda, Mali, and Mongolia, these concentrations are more significant. Perhaps this explains why increased mortality in poorer countries adds to ambient air pollution (Owusu and Sarkodie 2020; Srivastava et al. 2020). In the propagation and control of SARS-COV-2, meteorological factors have a significant effect. Dew, pressure-wind gust and wind speed enhance the transmission of SARS-COV-2. At the same time, high ambient temperature and relative humidity have a mitigating impact on SARS-COV-2. reducing the number of confirmed cases, according to our observational data. The virus's lifespan is shortened in an environment with high relative humidity and high ambient temperature. Degradation and instability of environmental circumstances for virus life are also due to this ecological state (Gautam et al. 2021a, b; Gautam et al. 2020a; Casanova et al. 2010).

In the outside environment, the risk of SARS-COV-2 infection is low (Weed and Foad 2020, Balram et al. 2021). Doctors and researchers indicate that coronaviruses are more active in damp and chilly settings than in dry and warm ones. Contini and Costabile (2020) found that the virus's dissemination mechanism of suspended droplets by coughing or sneezing exacerbated airborne transmission (Gautam et al. 2021d; Asadi et al. 2020). Furthermore, we discover a significant positive association between air pollutant species and SARS-COV-2 instances. Immunological activities are indirectly related to the oxidation and pro-inflammatory machinery of the lung, and systemic modification dynamics of the human system, increasing ambient PM 2.5, ozone, and nitrogen dioxide (Contini and Costabile 2020; Gautam et al. 2020a, b; 2021). Evidence suggests that prolonged exposure to air pollution increases the risk of asthma, pneumonia, chronic obstructive pulmonary disease (COPD), and other respiratory illnesses (Gautam et al. 2020b; WHO 2016). China's severe acute respiratory syndrome, which killed over 349 people between 2002 and 2004, is said to have been caused by air pollution. In other research, ambient air pollution has been linked to cardiovascular disease and asthma-related deaths (Lelieveld et al. 2019; Williams et al. 2019). There is a clear connection between cardiovascular disease, diabetes, and SARS-COV-2. SARS-COV-2 is more likely to affect those with weakened immune systems, such as cardiovascular disease, diabetes, and smoking habits. A SARS-COV-2 infection increases the risk of death for respiratory infections and underlying health problems such as cardiovascular disease, diabetes, and smoking (CDC et al. 2020; Guan et al. 2019). Our study found that cardiovascular illnesses, diabetes, and smoking contributed to an increase

in SARS-COV-2 related fatalities. Long-term exposure to poor air quality, according to UK research, increases the risk of SARS-COV-2 (Viviane et al. 2021).

6 Conclusion

This review article elaborately discussed the positive and negative effects of SARS-COV-2 diseases. We have gathered information about the impact of the said disease on air quality, human socio-economic conditions, and human health. Global warming and climate change is the biggest worry of the 21st century. This review article showed some important findings like, decline of some major air pollutants, 58.82% decline of PM $_{2.5}$ ($\mu g/m^3$); 72.22% decline of PM $_{10}$ ($\mu g/m^3$); 69.56% decline of NO_2 ($\mu g/m^3$); 72.20% decline of CO ($\mu g/m^3$). Other than that, this paper indicates the examples of several social misconducts happened due to less economic growth. These are like, suicide and self-injury, alcohol and drug abuse, child and domestic abuse, gambling, and psychosocial risks (including social detachment, entrapment, cyberbullying, feeling as if you're a burden and being unemployed, unhappy in relationships, and homeless. Many people also found scared with lockdown questions (1. He/ She had been worried about developing COVID–19 diseases inside, 2. He/ she had been worried about the development of COVID–19 diseases in his family members, 3. Fear of losing loved ones). Human activities cause the emission of greenhouse gases which makes the earth's temperature rise. The SARS-COV-2 pandemic halt in travel and industries has caused a significant drop in the emission of greenhouse gases like CO_2 and NO_2. This reduction of greenhouse gases leads to an increase in air quality and a positive effect on the environment. Some countries are attempting to find a cure for SARS-COV-2, and some even said that the vaccination is in its middle stage, but we all know that it will take more than 1–2 years to vaccinate the world fully. After completing vaccination across the globe, we will get the ordinary world without lockdown and other safety measurements. As the proverb says, one's loss is another's profit. Death cases from SARS-COV-2 are also responsible for air pollution, which is also under research. The burning of dead bodies of confirmed cases has been increased day by day and creates air pollution. Meteorological conditions like pressure, dew, wind gust, and wind speed were found to escalate the spread of SARS-COV-2. However, high relative humidity and ambient temperature have potential effects in reducing the viability and lifespan of the virus, hence, declining the number of confirmed cases (Gautam et al. 2021c). This proverb is most fitted for the present condition. When humans are under lockdown, nature is recharging its energy. We must know that this lockdown is

not the cure for SARS-COV-2 or climate change. We, the people, will now be more responsible for protecting our environment because we have seen the consequence of the exploitation of nature. This SARS-COV-2 pandemic has taught us a lesson that no money or luxury can save us from calamities. Nature is always more potent than humans. Now maybe due to this Coronavirus, we have to live with the restriction of social distancing will have to use masks and gloves throughout life, but we have to have a good approach towards the future and hope for the best, and stay positive towards the end.

Declarations

Conflict of interest The authors have not disclosed any competing interests.

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