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The Positive Effects of Covid-19 Lockdown on Environmental Attributes: A Review

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ABSTRACT

The effect of covid 19 on human health was devastating and the fatality rate was high around the world. World Health Organization declared the outburst of this infectious disease a pandemic situation. To check the rapid dispersal of the COVID-19 virus, most countries of the world enforced quarantine and strict lockdown. The effects of COVID-19 lockdown on environmental health draw the attention of the scientific communities. Therefore, this research paper inspected and narratively reviewed the observed effects of COVID-19 lockdown on the changes in the environmental quality based on secondary research data. The work provides a distinct indication considering the impacts executed by COVID-19 lockdown on the air, water, soil, and noise as typical environment elements. It has been widely reported that the amount of pollution in the air, water, soil, and noise exhibited a significant decline during lockdown period. It has been noticed in different literature that global air quality improved because of less anthropogenic emissions of air contaminants and atmospheric particles. For instance, releases of carbon, nitrogen, sulfur and particulate matter are reduced and ozone layers were reported to being increased. Aquatic life and water ecosystem have also been restored in many countries due to less commercial fishing. Moreover, soil pollution was less due to a significant decrease in solid and water waste dumping. Because of less transportation of vehicles, industrial and other urban activities, sound pollution dropped to a significant level. Clean beaches, transparent seawater, wildlife sightings and free movement of animals and birds were also found in some counties during lockdown. However, these effects of lockdown were temporary, as the world again enters the pre-lockdown situation. Human attitudes must be changed to continue the positive impact on the environment. World policymakers should take the necessary steps to guarantee the steadiness of the positive environmental effects derived from the COVID-19 lockdown.

INTRODUCTION

People are relaxed while close to nature and stunned by the beauty of natural diversification. Two major elements exist in the environment i.e- the abiotic atmosphere (air, water and soil) and the biotic components (living organisms i.e, plants and animals etc.). Directly or indirectly we rely on nature to fulfil our basic (food, shelter, clothes and medicines) and aesthetic needs (Seymour, 2016). Hence, extraction of the natural resources from nature must be judicious for the sustainability of nature (Campbell & Sayer, 2003). Every so often people just extract and exploit in a way which reduces the number of natural resources and destroys the quality of the natural habitat which results in the extinction of the species (Cardinale et al., 2012; Gamfeldt et al., 2013; Hector & Bagchi, 2007; Naeem et al., 2009). Besides, this unwise use of natural resources has actuated the greenhouse gas emission and turned into global warming (Farmer & Cook, 2013; IPCC, 2014). As a consequence, the ecological balance is interrupted and food chain of an ecosystem is disturbed, and natural harmony is getting hindered.

The world population is increasing and the demand as well. A huge amount of resources is being used and cautiously or incautiously being exploited daily due to poverty, greediness, ignorance, lack of environmental education and so on. This is creating a threat to human

health in the global arena. For instance, people living in the rural area as well as near the natural environment, forests etc. economically poor people enter into unknown territories of wildlife to search for food (hunting), to rear livestock. With ill motives, they used to clear forests and extract resources for business interests, so people are getting closer to wild animals, which results in exposure to the pathogens that usually people are not adjusted to. Additionally, people intake bushmeat - bats, monkeys, forest antelopes and wild animal species. By troubling ecosystems, such situations have been raised letting the viruses catch up with the new host – “man” with nightmare effects. Some said nature takes revenge itself, probably this comes out true.

As a consequence of AIDS, SARS, EBOLA now covid 19 has an outburst and become pandemic within a short time. The origin of covid 19 is supposed to be a wildlife animal (i.e Bat). So far (from December 2019 to date), before the vaccine was invented a lot of people died all around the world.

At the end of 2019 in Wuhan, China people associated with viral pneumonia caused by an unknown microbial agent were reported (Huang et al., 2020). The number of diseased people increased rapidly and, this outburst became a nationwide crisis about a month later in China (CDC, 2020; Chan et al., 2020; World Health Organization,

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2020a; 2020b). Later on, this disease spread fast around the world and almost all the countries are affected and becomes a pandemic disease during this era. This disease is because by the novel Coronavirus which is named 2019 novel coronavirus (COVID-19). COVID-19 is a new strain belonging to the large family of Coronaviruses (CoV), that was not recognized before in humans. This virus may cause sickness like fever, cough, respiratory symptoms (shortness of breath and breathing difficulties) and in more serious cases it may cause pneumonia, respiratory syndrome, kidney failure and ultimately death. As shortly as the Coronavirus (COVID-19) issues are confirmed and become pandemic in the whole world, millions of people were put into quarantine. Starting with China, authorities of the affected countries locked down temporally transportation, educational organizations, tourism, industries, organizations, etc. This lockdown limits the entrance and departure within and in between the cities except for some important vehicles. Inhabitants were allowed to go outside only for medicinal and grocery purposes. The principal causes of pollution include human movement, traffic, industry, power generation and inhabited energy use etc. have been left limited to a full standstill in most countries. Due to COVID-19 lockdown anthropogenic activities were less, and usage of vehicles in conveyance was limited which may provide a positive effect on the natural restoration by mitigating GHGs and other anthropogenic gases i.e, CO₂, CO, NO₂ etc., refining air quality, altering human attitudes which lastly can reduce global warming.

According to Rahim et al., (2020) during the lockdown in China, around 200 million tons of CO₂ emissions were reduced along with NO₂ reported and a reduction in fossil fuel burning was also reported. Due to lockdown actions, air pollution has declined by approximately 20% across 27 countries (Venter et al., 2020). China, Germany, UK, Italy and some other countries have experienced falling in carbon dioxide and nitrogen dioxide by around 40% during lockdown Jonathan Watts. Which may lower the risks of lung disease, asthma and heart attacks by refining air quality.

However, COVID 19 lockdown is supposed to provide a scope for the natural ecosystem to re-establish. Air and water quality are improving, environmental pollution is declining, grasslands and plants are growing healthy, and animals are moving freely. So, we can hypothesize that Covid 19 is a blessing for the environment to restore. At the same time due to Covid 19 lockdown, some beneficial physical events (i.e workshops, Seminars, conferences, and public awareness regarding the conservation of nature of researchers) were also stopped. Visually, degradation and restoration are going on simultaneously. So, it is an obvious responsibility of human beings to do something in favor of conserving nature.

So far, to the best of our knowledge, there are very few studies regarding the impacts of COVID-19 lockdown on the quality of the environment and human attitudes. In this article, we reviewed some studies regarding Covid

19 lockdown in the global arena. The work focuses on the changes due to the lockdown and quarantine measures enforced worldwide and summarizes the literature results of the observed effects on the environment. This study provides an overview of the effects of lockdown on the different elements of the environment, i.e., air, water resources, soil, wildlife etc. and human attitudes. By considering the abovementioned words, this piece of research is expected to evaluate the impacts of the COVID-19 lockdown on the quality of nature and human behavior. In addition, it will help to highlight ample options for policymakers and the scientific research community in formulating a plan for a better environment in future.

METHODS

The methods of this work are to summarize constructively, discuss, and relate the several observations published on the effects of the COVID-19 lockdown on environmental quality and reduction or changes of anthropogenic activities towards nature. The collected and brief observations have been selected to represent several countries of the world and to evaluate the global influence of the COVID-19 lockdown on the environment. Some works have been available reporting impacts of the COVID-19 on the environment. In this paper, we reviewed the positive impacts of the COVID-19 lockdown on different elements of the environment such as air, water, soil, sound and wildlife habitat etc. This review article is based on different observations published in research articles and available in online and offline journals. We searched through PubMed and Google Scholar using the terms 'lockdown' 'Covid 19', 'Environments', 'Impacts', 'Human', 'behavior', as a basis for reviewing. Research information from national and international journals, magazines, books and documentaries etc. has been used for the article. Booklets, brochures, project results, programs, videos etc. have been used as the secondary source of information. Browsing, collecting, observing, scanning and sorting out of data were done to make the article complete and comprehensive.

RESULTS AND DISCUSSIONS

Effects of Covid 19 lockdown on environment

As soon as the COVID-19 outburst the World Health Organization (WHO) declared it a pandemic situation on 11th March 2020 (Mitra et al., 2020). To mitigate the man-to-man transmission isolation, quarantine and lockdown were executed all over the world. This strict lockdown forbids inter and intracity communication (train, bus, flight), travel, picnic and educational institutions, trading and industry shutdowns etc. Due to less anthropogenic activities, numerous environmental benefits from the COVID-19 lockdown on planetary health have been noticed.

This research work reveals the effects of the Covid-19 lockdown on the changes of several attributes of the environment and explores the optimistic attitudes

and commitment of humans to save nature during the covid-19 lockdown. Limited human interaction with nature during the critical period has appeared as a blessing for nature and the environment. Information from all over the world are representing that during the lockdown, environmental conditions (air, water and soil quality) are improving and wildlife is flourishing (Bhat et al., 2021; Elsaid et al., 2021; Loh et al., 2021; Lokhandwala & Gautam, 2020; Wang & Su, 2020). Improvement of environmental quality such as purified air, cleaner rivers, less noise, and uninterrupted and peaceful wildlife during lockdown is noted by Arora et al., 2020.

The consciousness of people comes up after observing the natural degradation and devastating effect of covid-19 on the human being. With the need of the growing population pressure habitat loss, pollution, and exploitation of wildlife happens, which brutally degrades the natural ecosystem before the covid-19 lockdown. Most of the literature considered that natural wildlife is the origin of Covid 19, people entering an unknown area, consuming wild animals i.e, bushmeats, exposing to unknown pathogens could be the reason for the outbreaking of pandemic disease covid-19 .

Air Quality

The earth suffered a lot because of air pollution with the increasing NO₂, CO, CO₂, SO₂ and particulate matter etc., especially in urban areas. Before Covid-19 according to WHO, 2016 worlds 8% of are died because of air pollution. The lockdown limits mobility and other anthropogenic activities, so improved air qualities have been found in most towns & cities. The strictness of the COVID-19 lockdown allows us to observe clean air and clear blue sky. Improved air quality, as well as a decrease in sulfur, carbon, nitrogen and particulate matter emissions and water quality in natural resources, has been reported during lockdown periods (Bhat et al., 2021; Elsaid et al., 2021; Shehzad et al., 2021). On the other hand, ozone layers in the air have increased, mainly in response to the reduced emissions of nitrogen (Elsaid et al., 2021; Kumari & Toshniwal, 2020; Islam et al., 2021). There was an 11.4% improvement is noticed in the air quality of China (Bhat et al.,2021).

Kerimray et al., 2020 reported that the PM_{2.5}, CO and NO₂ concentration was reduced, while, O₃ concentrations were increased by 15%. In a study by Tobías et al., (2020) O₃ concentrations were found to be increased by around 50% during the lockdown period. A 2% increase in O₃ concentration was reported in a finding (Shehzad et al., 2021) and there was a 17% increase in O₃ (Sharma et al., 2020). In western India Increasing O₃ (16–58%) was reported mainly due to less NO emission (Selvam et al., 2020).

The Carbon compounds (CO₂, CO etc.) emission in environmental air are because by natural and anthropogenic activities. Anthropogenic Sources of gaseous emissions such as transportation and industrial sections shut down, which in return resulted

in a significant reduction of emissions. According to Kerimray et al., 2020, CO concentrations were reduced by 49% in their work. According to Shehzad et al., 2021 CO concentrations were reduced by 37% during the lockdown. Bhat et al., 2021 observed concentrations of CO (–64.8%) declined in Brazil during the lockdown.

NO₂ emission was reduced by 20–30% in China, Italy, France and Spain, and 30% in the USA Compared to the previous year, significant reductions in NO (–77.3%), NO₂ (–54.3%) concentrations were observed in Brazil, NO₂ (–52.68,) concentrations were observed In India (Bhat et al., 2021). In another research Kumari & Toshniwal, (2020) Showed due to limited anthropogenic activities NO₂ were reduced by 32–64% during the lockdown. A reduction of 30–84% in NO₂ was also observed during the COVID-19 lockdown in western India (Selvam et al., 2020).

Particulate matter emissions are also declined along with other air pollutants of carbon, NO_x and SO_x which are produced from a similar source of fossil fuel combustion. The statement research has shown a decline in PM concentration up to 20.5% in China, up to 85.1% in Ghaziabad, India, 39.2% in Spain, and 31% in California, USA (for PM_{2.5}) (Elsaid et al., 2021). Some research showed that PM_{2.5} concentration was reduced by 21% (Kerimray et al., 2020), A lower reduction was observed for PM₁₀ (–28 to –31.0%) (Tobías et al., 2020). The concentration of PM_{2.5}, PM₁₀ were observed declining 42% and 50% respectively (Shehzad et al., 2021). Near about 43% and 31% decreases in PM_{2.5}, PM₁₀ was observed during the lockdown period compared to previous years (Sharma et al., 2020).

The major cities and urban areas are more vulnerable to environmental pollution. So, during lockdown urban areas, big cities and towns were found to be more influenced by improved environmental quality by the restricted emissions (Islam et al., 2021). The average SO₂ concentrations were reduced by 43%, and In the capital city of Bangladesh SO₂ concentrations declined approximately by 67% (Islam et al., 2021), Compared to the previous year's 41% declines in SO₂ were observed during the lockdown period (Shehzad et al., 2021). Based on research in India, there was about –17.97% of SO₂ (Bhat et al., 2021).

Water Quality

As a result of rapid industrialization, urbanization and overexploitation of water bodies i.e, rivers, lakes, oceans, groundwater reservoirs are getting polluted every day. Throughout the lockdown period, the main causes of water pollution such as illegal dumping of waste, industrial residues and crude oils have stopped in the water bodies. Thus, water pollution was reduced. During this Covid 19 lockdown, several papers and print media reported on the clean and clear freshwater river and sea water which is a result of less anthropogenic activities. Therefore, improved water quality in natural water resources has been noticed as well (Arora et al., 2020; Bhat et al.,

2021; Elsaid et al., 2021; Loh et al., 2021; Lokhandwala & Gautam, 2020). Different literature represented the improved quality of water such as clean beaches because of slowdown and fewer activities of human being in other places. (Ormaza-Gonzalez et al., 2021; Zambrano-Monserrate et al., 2020).

Important environmental changes were demonstrated during the COVID-19 lockdown. 500% reduction of sewage and industrial run-offs in rivers was reported and on the other hand Dissolved oxygen (DO), Biological oxygen demand (BOD), pH of river water has been improved by 79%, 30% and 7.9 respectively (Arora et al., 2020). The average Suspended Particulate Matter (SPM) has significantly decreased by about 36.48% when compared with the pre-lockdown period (Aman et al., 2020), where the (SPM) concentrations are evaluated to underline the turbidity levels. Additionally, the beaches have less plastic and garbage, more fish, and large marine organisms, including humpback whales, dolphins and manta rays were noticed close to the sea shore (Ormaza-Gonzalez et al., 2021).

Noise

Noise is an unwanted sound beyond human tolerance which is mostly created by anthropogenic activities i.e, industrial or profitable economic activities, transport of vehicles, high-volume tunes etc. Sound pollution is one of the chief reasons for the health deterioration of humans. Imposing strict lockdown during covid-19 outbreaks associated with less transport, and reduced economic and commercial activities. There were no public and private gatherings, no gaming, closed shopping malls, businesses and restaurants, educational institutions, industries and factories shut down etc. These circumstances have brought a significant reduction in sound level.(Bhat et al., 2021; Loh et al., 2021; Zambrano-Monserrate et al., 2020).The noise level was reduced up to 35% to 68% all over the world (Arora et al., 2020). In Madrid, there was a reduction of 4 to 6 dBA during the lockdown which is captured by the monitoring network (Asensio et al., 2020). Research work also documented that the pandemic lockdown led to a 5–10 dB decrease in the anthropogenic sound level in Shillong, India (Somala, 2020).

Soil

The soil is an integral element of the ecosystem that controls not only the adjacent environment but also affects water, climate, and food production. Soil is being contaminated due to anthropogenic activities, to be more specific urbanization and industrialization led to reducing its quality eventually declining crop yield. Soil pollution reduces soil organic matter and deteriorates the quality of its biodiversity as well as the quality of groundwater (Singh & Singh, 2020). Wastewater and sewage sludge contribute to soil pollution as well. Therefore, a significant decline in solid and water waste led to less soil pollution (Loh et al., 2021). During the epidemic situation, there was a significant reduction in solid waste and sewage disposal.

In Tunisia 85% of respondents showed positive attitudes toward food waste prevention through a policy of saving, storing, and eating leftovers (Jribi et al., 2020) in a survey. A survey In two cities of Morocco, Khenifra and Tighassaline, showed a decrease in municipal solid waste (2572 tons versus 2456 tons; 136 tons versus 126 tons, respectively) compared to the previous year (Ouhsine et al., 2020). In Shanghai, China, there was a decrease of around 23% in household waste (Fan et al., 2020) was reported.

Wildlife

During the lockdown, humans kept themselves within four walls of home and lessened outside activities, which provides an opportunity for free space for animals and birds to move on. There was also a flow in wildlife sightings during the COVID-19 pandemic lockdown, especially in urban environments (Loh et al., 2021; Lokhandwala & Gautam, 2020). It was observed that many animals come outside of their territory and birds move freely without hesitation during the lockdown period, for instance, peacocks, monkeys, elephants, dolphins and migratory birds etc. More migratory birds are found in several lakes and water bodies (Arora et al., 2020). Because of less traffic noise, frequencies of sweet singing of birds and more chirping sound were heard clearly (Derryberry et al. 2020). Humpback whales, Dolphins and manta rays were noticed swimming near the sea shore because of fewer fishing activities of the fish farmer (Ormaza-Gonzalez et al., 2021).

Human Behavior

During the lockdown period, the beauty of the uninterrupted natural environment creates an optimistic sense among the people. So, they are more concerned with nature and natural ecosystems and gaining knowledge and interest in training on their conservation. After observing the devastating effects of Covid 19 on human health and the positive impacts of lockdown on natural ecosystems, most people have amended their minds set up for the well-being of nature, now they are thinking positively, and their behavioural attitudes have changed positively towards nature, self-realization has arisen regarding future planning on nature. Some activities such as tree plantation, taking care, feeding and building relationships with the street animals i.e, dogs, cats, birds etc. are noticed during the lockdown. The effect of the lockdown was strong on people's relationships with their pets, farm animals, home plants and birds (Vimal, 2022). As the restaurant activity was stopped so these animals were starving from the left-over food of the restaurant on which they were mostly dependent (Vimal, 2022).

CONCLUSION

The COVID-19 pandemic with a high fatality rate is a danger worldwide to human beings. Due to this epidemic condition, a lockdown with limited human activities was enforced around the whole world. Such limitations are a

blessing for nature as nature restored itself, and provide us with a chance to explore the effect of Covid 19 lockdown on the environment.

Though there are some negative effects of the pandemic situation, this work revealed that the environmental quality has improved to a large extent. The positive effects of lockdown on different environmental elements are better air quality, water bodies being cleaner and higher animal movements and bird frequency. In different literature, lower temperature, less noise, and less municipal waste are also noticed during the lockdown period. The changes that occurred during lockdown were significantly compared with the pre-lockdown situation to understand the temporary effects and to predict the consequence in the future.

The relaxed, quiet and pollution-free nature during the lockdown and the devastating effects of Covid 19 on the human being encouraged people and make them more concerned about nature and their uses of natural resources. Creating public awareness, and amending of lifestyle and behavioral attitudes of the public may lead to less anthropogenic activities to build a positive environment. People are now more motivated to support decent initiatives by the government for the conservation of nature.

In addition, Afforestation, using renewable energy, reducing emissions, and intermittent lockdown can be recommended to restore the natural environment.

However, this is a momentary effect, environmental pollution is going to start over as soon as the lockdown ends. Thus, more careful planning and supervision will be needed in the long run. Firstly, it can be recommended that strict legislation should be enforced to reduce the overexploitation of natural resources. Secondly, the global scientific community should take initiatives for reducing pollution to improve environmental quality in the long term.

Conflict of Interest

No conflict of interest is associated with this research.

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