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COVID-19: A Global Pandemic and its Impacts

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ABSTRACT: COVID-19 is an infectious disease that primarily affects lungs and has been declared a pandemic by World Health Organization (WHO) on March 11, 2020. It is caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). It was first identified in the end of December 2019 in Wuhan city, China. Now many countries across the globe are fighting against the disease. The death toll due to this pandemic has risen more than 1.7 million across the globe till date. In this paper, we will study about the COVID-19 and its impacts on the society, environment and economy on the global scale.

KEYWORDS: COVID-19, Global pandemic, Lockdown, Social distancing, GHG emissions, Pollution, Economy.

I. INTRODUCTION

COVID-19 is an infectious disease caused by novel corona virus or severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) that suppresses the body's immune system so that the viruses can grow in the respiratory tissues and organs [1]. SARS-CoV-2 is an enveloped, positive-sense, single-stranded RNA beta-coronavirus. Similar to SARS and MERS, the SARS-CoV-2 genome encodes non-structural proteins (such as 3-chymotrypsin-like protease, papain-like protease, helicase, and RNA-dependent RNA polymerase), structural proteins (such as spike glycoprotein) and accessory proteins [2]. Over 80 million cases of virus infection were reported all over the globe, with most fatalities reported in the United States of America, Brazil, India, Mexico, Italy, United Kingdom, France and Spain [3]. Symptoms of COVID-19 are highly variable ranging from none to severe illness. Common symptoms are included fever, chills, cough, sore throat, breathing difficulty, fatigue, nausea, vomiting and diarrhea. Severe cases can lead to cardiac arrest, respiratory failure, acute respiratory distress syndrome and even death. The virus mainly spreads through the air when people are near to each other. When any infected person breathes, sneezes, coughs or even speaks then the virus may enter to another person via their mouth, nose or eyes. It might also spread by contaminated surfaces. The person remains infected for up to two weeks. Although it may be dangerous in all age groups, people who are elderly or with prior illness are more vulnerable to the severe effects of COVID-19 due to inadequate immune systems. Inadequate healthcare management, such as failure to provide early diagnosis and prompt treatment, would decrease the rate of recovery among COVID-19 patients. Recommended preventive measures include social distancing, wearing a face mask and hand gloves in public, ventilation and air-filtering, frequently hand washing with soap, use of sanitizers, covering one's mouth when sneezing or coughing, disinfecting surfaces, and self isolation for people exposed or symptomatic.

The governments of most of the affected countries restricted the movement of people to control the spread of corona virus. It is found that enforced lockdown in India restricted the movement of largest number of people (approx 1.35 billion) in order to prevent infection due to COVID-19. In India, the battle against corona virus started from 22nd March, 2020 in the form of 14 hrs (from 7:00 AM to 9:00 PM) "Janta Curfew". The nationwide first lockdown came into effect on 25 March, 2020. Thenceforth until 18 May, 2020, the lockdown in India has been renewed four times: Phase-I (Lockdown 1) ending on 14 April, 2020 (21 days); Phase-II (Lockdown 2) ending on 03 May, 2020; Phase-III (Lockdown 3) ending on 17 May, 2020; Phase-IV (Lockdown 4) ending on 31 May, 2020 (14 days); Phase-V (Lockdown 5), only for containment zones, ending on 30 June, 2020 (30 days) [4]. Different phases of lockdown had different forms/levels of restrictions in different locations/zones. Except emergency services (medical, police, fire, food supply etc.), all other organizations like school, colleges, industries etc. were closed to encourage people to stay at home. All means of transportation (bus, trains, aeroplanes etc.) except emergency services were suspended.

II. METHODOLOGY

This study has been done by reviewing the available literature in the form of research papers, review articles, information from different government and non-government organizations through their reports and official websites. The required scientific data was collected through electronic means from the database of Scopus, Web of Science, Science Direct, Springer, PubMed, Google Scholar, Directory of Open Access Journals, Research Gate etc.

III. IMPACTS OF COVID-19 PANDEMIC

The COVID-19 pandemic has impacted every segment of life like commercial establishment, education, economy, transport, tourism, employment, entertainment, food security, sports, environment etc. Some of them are described below in details.

1. Impact on Society:

COVID-19 has impacted almost every society in the world. The social distancing and lockdown are found important techniques to control the influence of COVID-19, but it seems that social distancing is becoming a new form of untouchability. In the contemporary society, due to COVID-19 all the constitutional norms eliminating untouchability and promoting integration seems to be failed as people are asked to maintain social-distancing. Of course, social distancing may play a crucial rule to slow down the rate of infection but we must see that it should not revive the social discriminatory practices. Amidst the lockdown in Indian society, multiple issues related to social, educational, economical, political, agricultural, psychological levels and many more have been noticed which has created the devastating impact on the lives of the people. Research shows that isolation and job loss is associated with increased depression, anxiety, distress, and low self-esteem and may lead to higher rates of substance use disorder and suicide. In the lockdown period, people faced situations like isolation and job loss which disturbed them mentally and the outcomes have been faced by women and children in the form of domestic violence. Many adults reported specific negative impacts on their mental health and wellbeing, such as difficulty in sleeping (36%) or eating (32%), increases in alcohol consumption or substance use (12%), and worsening chronic conditions (12%), due to worry and stress over the corona virus.

2. Impact on Environment:

During COVID-19 period, the movement restriction and a significant slowdown of social and economic activities have impacted on environment both positively and negatively. The positive and negative impacts of enforced lockdown during COVID-19 pandemic are given below.

Positive Impacts:

In many regions of the world, the improvement in quality of air has been seen. It has caused substantial drop in air pollution with a reduction in water pollution and noise pollution as well [5]. During the lockdown, the reduction in the value of Air Quality Index (AQI) in various cities of India has been observed. More specifically, nearly 30% decrement in AQI was recorded while comparing the previous year's values [6]. North India observed a highest reduction of ~44% followed by southern and western India (~33% and ~32%, respectfully). The residents of Jalandhar (a city in Punjab) and Saharanpur (a city in Uttar Pradesh) were able to see the Himalayan peaks and ranges due to the drastic drop of AQI in these cities [4]. As, Industries, transportation and companies all over the world have closed down, it has brought a sudden drop in burning of fossil fuels resulting in reduction of greenhouse gases (GHGs) emissions which further reduced the rate of global warming. According to the European Environment Agency, drops in nitrogen dioxide (NO₂) emissions of 30% to 60% are being recorded in many European cities including Barcelona, Madrid, Milan, Paris and Rome [7]. In China, lockdowns and other measures resulted in a 25% reduction in carbon emissions and a 50% reduction in Nitrogen oxides emissions. In USA, NO₂ declined 25.5% during the COVID-19 period as compared to previous years [8]. Connerton et al. [9] investigated the levels of four air pollutants Carbon monoxide (CO), Ozone (O₃), Fine particulate (PM_{2.5}) and Nitrogen dioxide (N₂O) in four western Megacities Sao Paulo, Paris, Los Angeles and New York during the COVID-19 period. They found reduction in the levels of PM_{2.5}, CO, NO₂. It was also stated that, the levels of NO₂ and other important air pollutant PM_{2.5} is reduced by almost 70% in Delhi [10]. The PM_{2.5} is very fine particulate matter having an aerodynamic diameter less than 2.5 microns. These are capable to penetrate deep into the lungs and can enter the bloodstream. Exposure to PM_{2.5} can cause such deadly illnesses such as lung cancer and heart stroke. Overall, 46% and 50% reduction of PM_{2.5} and PM₁₀ respectively, was reported in India during the nationwide lockdown. It is reported that, coal-based power generation reduced 26% in India with 19% reduction of total power generation after lockdown. China, the highest coal consumer in the world, dropped 36% compared to same time of the preceding year.

Water pollution is also found reduced during the ongoing COVID-19 pandemic period. In India, during the lockdown period, the major industrial sources of pollution have shrunk or completely stopped, which helped to reduce the water pollution in rivers like Ganga and Yamuna. It is found that, among the 36 monitoring stations of river Ganga, water quality at 27 stations was found suitable for bathing, propagation of wild life and fisheries in the lockdown period [11]. According to the real-time water quality monitoring data of the Uttarakhand Pollution Control Board [12] of India, physicochemical parameters i.e, pH (7.4-7.8), dissolved oxygen (DO) (9.4-10.6 mg/L), biochemical oxygen demand (BOD) (0.6-1.2 mg/L) and total coliform (40-90 MPN/100 mL) of the river Ganga was found within the surface water quality standard of India. It is reported that, due to the lockdown of COVID-19, the Grand Canal of Italy turned clear and many aquatic species reappeared [13]. With the help of remote sensing images, it is found that the surface water quality of the Vembanad Lake, the longest freshwater lake in India in terms of suspended particulate matter (SPM) is improved [14]. The SPM concentration during the lockdown period was found to decrease by 15.9% on average as compared with the pre-lockdown period.

Noise pollution is also reported to drop during the lockdown period by various researchers. The quarantine and lockdown forced the people to stay at home which reduced economic activities and communication worldwide, which ultimately reduced noise level in most cities. Global data shows that the traffic movement is down by 54%, 36%, and 19% in the United Kingdom, United States, and China respectively. Policies towards social distancing by various ministries brought down the noise that emanates during commercial events, marital and/or religious processions to negligible levels. Noise level of Megacities like Delhi and Kolkata is reported to drop drastically around 40-50% and 50-75% respectively in the recent lockdown period [4, 15].

The outbreak has also provided cover for many illegal activities such as deforestation of Amazon rainforests and poaching in Africa.

Negative Impacts:

Since the outbreak of COVID-19, medical wastes (needles, syringes, face masks, gloves, used tissues and discarded medicines) generation is increased globally, which is a major threat to public health and environment. For sample collection of the suspected COVID-19 patients, diagnosis, treatment of huge number of patients, and disinfection purpose lots of infectious and biomedical wastes are generated from hospitals [5]. For instance, Wuhan in China produced more than 240 metric tons of medical wastes every day during the time of the outbreak [16], which is almost 190 metric tonnes higher than the normal time [17]. In Ahmedabad, the amount of medical waste generation is increased from 550-600 kg/day to around 1000 kg/day at the time of the first phase of lockdown [4]. Dumping these wastes in open places can create clogging in water ways and worsen environmental pollution. Usually, Polypropylene is used to make N-95 face masks, and Tyvek for protective suits, gloves, and medical face shields, which can persist for a long time and release dioxin and toxic elements to the environment. Since SARS-CoV-2 virus can exist a day on cardboard, and up to 3 days on plastics and stainless steel, the sudden rise of hazardous waste should be managed properly to reduce further infection and environmental pollution [5].

Recently, huge amount of disinfectants is applied into roads, commercial, and residential areas to eradicate SARS-CoV-2 virus. Such extensive use of disinfectants may kill non-targeted beneficial species, which may create ecological imbalance. Since, SARS-CoV-2 virus was detected in municipal waste water also in many countries including India, so additional measures in wastewater treatment are essential before draining it into nearby water body or river.

Impact on Economy: Adopted lockdowns by many countries across the world confined millions of citizens at their home, shut down businesses, and ceased almost every economic activity. Businesses across the world namely hospitality, entertainment, aviation etc. have seen a major negative impact. Various sports events such as IPL and Olympics have been postponed. Educational organizations like schools and colleges have been closed. The virus has also disrupted the functioning of various online giants such as Amazon. COVID -19 has also disrupted supply chain and global trade. The World Trade Organization (WTO) expects global trade to fall up to 32% this year. In overall, the pandemic has pushed the global economy into a recession which means the economy starts shrinking and growth stops. Economies such as the US, Japan, the UK, Germany, France, Italy and Spain are expected to contract this year by 5.9, 5.2, 6.5, 7, 7.2, 9.1 and 8 per cent respectively. According to a UN report, global economy is expected to contract by 4.3 % in 2020 which will wipe out global output worth over USD 6 trillion. The output in India is also expected to shrink by 5.9 % in 2020, before rebounding to 3.9 % in the next year. However, in India, finance minister Nirmala Sitaraman has announced some details of the Atmanirbhar Bharat Abhiyan package, to provide relief to Medium, Small and Micro Enterprises (MSMEs) in the form of an increase in credit guarantees.

IV. DISCUSSION

Covid-19 pandemic affected the life of human beings directly or indirectly in both positive and negative ways. In positive way, it is affecting the environment and climate. During lockdown, people around the world noticed some things which happened after many years. For examples, residents of Saharanpur and Jalandhar were able to see the Himalaya peaks and ranges after 30 years and that are believed to be at a distance of around 150-200 km from there, Delhi's AQI in the month March was lowest after 5 years, Olive Ridley turtles were seen nesting during the daytime on an Odisha beach, South Asian river Dolphins returned to the ghats of Kolkata after 30 years, air pollution in north India was found lowest for last 20 years, the water of river Ganga in Haridwar was found fit for drinking for the first time in 30-40 years, The water of Yamuna turned transparent after last 42 years in Mathura, and the bird species (migration of ~25–30% more flamingos compared to last year in Talawe wetland, Mumbai) were seen returning to their natural habitats [18].

On the other hand, it took so many lives across the world. Global economy has crashed. Factories, restaurants, pubs, markets, flights, super markets, malls, Universities and colleges etc. were shut down. Fear of the corona virus was so much that people have limited their movements and even not going to buy the daily essentials.

V. CONCLUSION

The outbreak of COVID-19 brought social and economic life to a standstill. The risk of global recession in 2021 is high. In order to minimise the crisis, the economic activity must begin gradually after screening of the labour force. Strict preventive measures should be implemented by the industry in order to safeguard the health of the workers. Work from home must be encouraged. The norms of social distancing, avoiding or cancelling gatherings, and use of masks and sanitisers should be the way of life till we are able to eradicate the virus. Government should come forward and provide financial assistance to those who are in need. Let us join together and fight against this pandemic.

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