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Experiencing COVID-19 from past to present/Overlooked COVID on a surge

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Abstract

The novel strain of COVID-19 has made a huge crisis with pneumonia like symptoms identified in Southern China during December 2019. This virus has originated from family of *Coronaviridae*, having a metagenomic RNA different from previous corona-based diseases. It has affected all the spheres of life, restricting of face-to-face communication, teaching being re-designed online, shortages of goods due to hoarding etc. This outbreak has led to repurposing of certain drugs due to uncertainty of medical facilities and improper consultations lined up for multiple prescriptions. On the other hand, medical assistants are working without break for the direct patient care. The health organizations are working together to curb the pandemic in all possible methodologies. This article gives an over view of nCoV's origin, affect on the society, symptoms, medication and possible treatment.

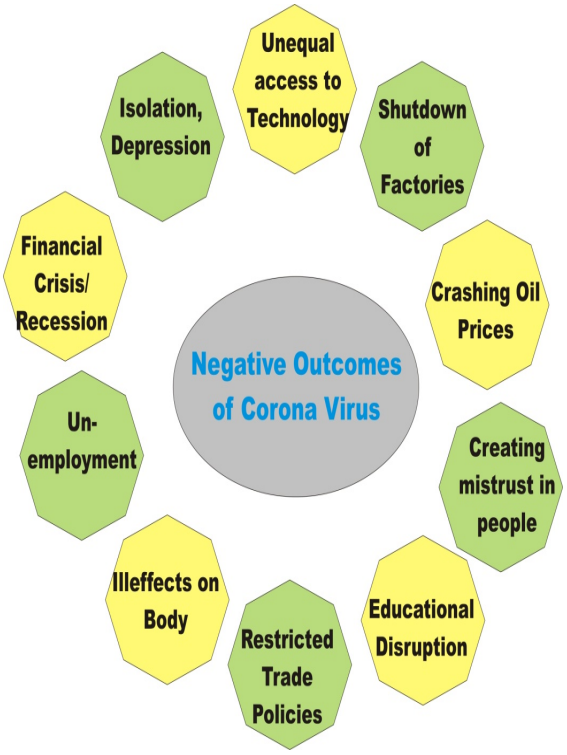
Keywords- **nCoV-19, infection, metagenomic RNA, RT-PCR, financial crisis.**

Introduction

The infectious diseases are on a rise with new diseases/ones getting incorporated into the human system. These diseases namely include severe acute respiratory syndrome(SARS) , Middle East respiratory syndrome (MERS), Zika virus, COVID etc. pose an urgent threat to global health[1]. The coronavirus is associated with distinct types of infectious diseases on the run; SARS led to a global pandemic in 2002-2003 followed by MERS in 2012. Despite of huge research and development in the arena of healthcare industry, novel diseases add uncertainty. COVID or Corona virus diseases 19, is one such unprecedented global crisis outbreak from group of SARS-like cornovirus (origin- family of *Coronaviridae*) also named as WH-Human1 coronavirus. The name is based on its characteristic morphology; it is an enveloped virus with icosahedral protein shell with club shaped spikes. Upon metagenomic RNA sequencing, it was found that family of virus contains a new RNA virus strain.[2] Further, phylogenetic viral genome of 29K nucleotides, the virus accounted for 89% nucleotide matching from genus Betacoronavirus, subgenus Sarbecovirus. It is caused by severe acute respiratory syndrome coronavirus 2. This particular genus Betacoronavirus has been reported in literature found in Chinese Bats.[3] The identification of SARS-like CoV in bats have led to the idea that animals act as host of a natural reservoir of these viruses[4]. Its causative pathogen is a phylogenic sister to the severe acute respiratory syndrome. Eventhough, it has similar sequence identity and same cell receptor as of SARS-CoV, but it has SARS-like viral pneumonia and illness

with asymptomatic infection.[5–7]

The first case encountered for COVID 19 emerged in Wuhan city, Hubei Province, China. Despite health responses for delaying the spread, several countries were confronted with a critical care crisis. Within a short span, the transmission escalated the outbreak to the whole world affecting 215 countries, with statistics of 39 lakh cases. The worst hit countries include USA accounting for maximum number of cases of 12 lakh followed by Spain 2.5 lakh and similarly for Italy and UK. The huge count of patients led to shooting up the demand in hospital beds along with shortage of medical equipment, personal protection equipment (PPE) kit and ventilators. The mode of virus transmission is from human to human contact or through the aerosols generated in air by a positive patient and via contaminated objects and surfaces.



Scheme 1: Cartoonist illustration of major drawbacks of COVID-19 in the life of people.

Apart from curing the people with such pandemic, the staff themselves got infected over their duties treating the needy, thus creating a huge void in the healthcare industry[8]. The staff has been working on a continuous shift with serious symptoms of insomnia. An example is the Wockhardt Hospital where 26 nurses and 3 doctors were found to be infected, thus shutting down the hospital and declaring it a containment zone. Later, strict infection control measures were adopted such as washing hands with both soap and sanitizers, wearing masks, gloves, wearing double layer of protective clothing and covers that were recommended by The Center of Disease Control and Prevention (CDC) in the United States during SARS outbreak[9]. In response to this, all visas were suspended across borders and disabling of entrance turnstiles within borders. All kinds of public transportation was shut except for consumption goods. Further, World Health Organization (WHO), health emergency program chief executive director Michael Ryan motivated countries to follow complete economic and social lockdown to curb the disease. He even said, that India (second most populous country) has tremendous capacity to deal with the outbreak and encourage the world in taking the pandemic. Parallely, WHO is also providing consultancy to combat the pandemic. It has supplied test kits and standards (SOP's) for the diagnosis and management of the disease. It has also donated PPE kits to the frontline workers and taken an initiative to up skill them on the necessary precautions for their health while being in contact with

the infected patients. Another organization, 'Oxford COVID-19 Government Response Tracker' gave a report from over 73 countries showing that Indian government has stringently responded with emergency policies in tackling the situation, followed by emergency investments in vaccine research, healthcare system and fiscal measures. Scheme 1 is a basic cartoon illustration with major drawbacks suffered by people during the pandemic.

Countries have also strengthened their diplomatic bonds during this consequential event of 21st century by donating kits, masks and other medical necessities to countries in need during the crisis. US announced $174 million to aid all the affected countries. While China donated 1 lakh personal protection equipment's (PPE) kits to India. In support to all, India has sent 88 health professionals to UAE and Emirates. All over the world, nations are understanding the criticality of the situation and share a helping hand to all. Not just countries, all organizations that are participating are adding from their end. Different publishing institutes are helping with creating hubs for guidelines, expert advice and latest details over the internet like Elsevier, Nature (Scientific Reports), BMC, etc with giving an open platform for published papers. The South Asian Association for Regional Cooperation (SAARC), a geo-political union jointly allocated 740 million funds as COVID-19 Emergency Fund.

Apart from response of countries, the electronic media played an intense role initiating various applications for spread of the precautions. World Health Program started a smartphone Whatsapp application portal to answer the queries about the disease, Aarogya Setu another initiative of Ministry of Electronics and Information Technology, India assisting the same cause. Other agencies like World Bank lauded early development of apps, while Apple and Google also announced such software building for tracing the movement of people in order to combat the situation.

The pandemic has also caused a tragic effect on the global economies. There is a clear impact on the markets worldwide wherein different stock exchanges are recording their all-time low. According to UN Department of Economic and Social Affairs, pandemic has disrupted the global supply chains and overall economical trade overseas with screeching halt to the tourism industry. The global economy is expected to shrink down by 1% with workers facing bleak prospect of job security. World Economic Forecasting Model has estimated major developing nations to witness the worst growth scenario. According to one such report, India is among the 15 worst economies with an impact of $348 million on its trade.

Literature and Background

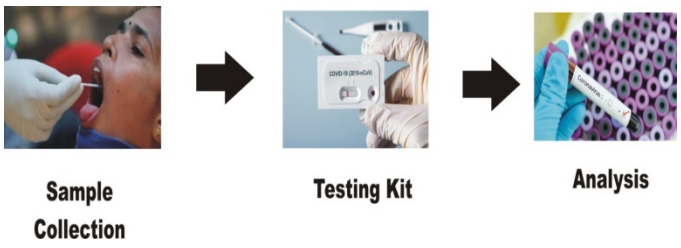
SARS was originated from family of coronavirus, that originated around 2002 particularly in Beijing, China. The disease spread quite quickly affecting 29 countries with 8,000 people. While MERS was from the same family, identified in Saudi Arabia around 2012.The putative recombination in the evolution of sarbecoviruses, the events involves four genome sequences namely; bat SARS like CoV Rp3, CoVZC45, CoVZXC21 and SARS-CoV Tor2. Wherein, bat SARS like CoV and SARS-CoV are capable of direct human transmission[10,11].

This infection was first accounted by health authorities of Wuhan institute of Virology, when a case of pneumonia associated with new coronavirus came up. The institute was the first to investigate the analysis, identification and name the genetic sequence with a public database[12]. By February 2020, institute applied the patent for using 'remdesivir' drug that inhibited in-vitro growth of virus[13].

The patients have reported diverse symptoms incurring sudden fever, cough or sore throat, chest tightness, weakness, etc. Along with abrupt changes in lab testing of C-protein, aspertase aminotransferase, lactic dehydrogenase, creatinine along with other biochemical blood analysis. A few patients showed mild hypoxamia and lymphoponia. Thus, based on above there were combination of antibiotic, antiviral and glucocorticoid therapy. Severity was observed later with respiratory failure and ultimately high flow of non-invasive ventilators are the last resort for administration of patients. Later, broncho-alveloar fluid (BALF) was collected to pursue aetiological agents cornered to this disease via meta-transcriptomic sequencing and genome sequencing was assigned GenBank accession number MN908947. Based on screened sequences, 30K nucleotides were closely similar to bat-SARS like coronavirus i.e. batSL-CoVZC45(GenBank accession number MG772933).[14] Further based on genomic sequencing, the evolutionary relationship was credited to the phylogenetic tree.

Brief Discussion about Medication, Precautions and Cure

Distinct methods were adopted to define the virus transmission, initially an infrared thermometer as a preliminary testing. China came with a concept to initially start the screening of patients using a triage workflow concept to analyse the disease. The triage process helped in guiding the patients to follow a four-level triage during hospital visits. People were segregated based on the history of visiting certain places, or contacted the confirmed positive cases and people with any fever or respiratory concerns into high risk exposure and low risk exposure groups[15]. Another theoretical concept of prediction models were established for the diagnosis and prognosis of infection[16]. Scheme 2 shows the methodology developed for sensing of virus.



Scheme 2: Methodology of COVID-19 testing at different diagnostic centers.

Further diagnosis is done using deep learning of genomic sequences i.e. estimation of C index. While other approach is to determine direct bilirubin and alanine transaminase. Even chances in lung periphery on chest computed tomography (CT) scan, normal or reduced white blood cell count were indicative of positive sample. Nucleic acid testing was also suggested over the time after continuous setbacks occurred due to rapid testing kits and

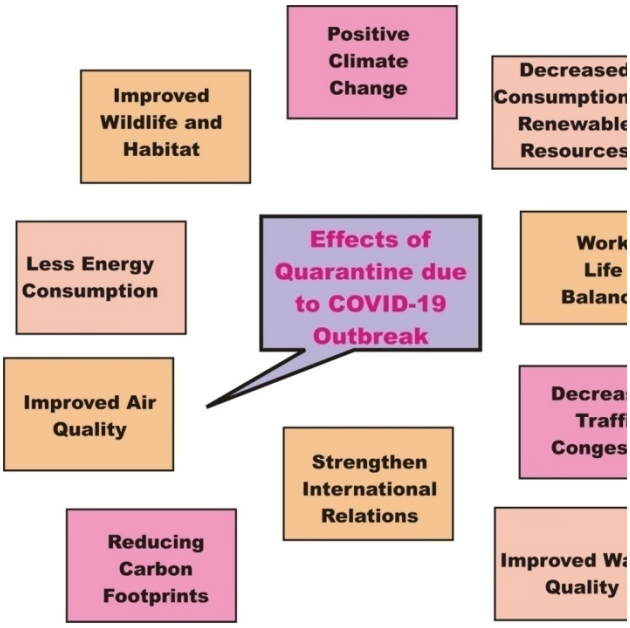
paper-strip based tests giving false negative response. In total, thirteen prediction models were proposed to support diagnosis of SARS-CoV[16]. But out of all, quantitative RT-PCR (Enhanced Real Time Polymerase Chain Reaction) was the most discriminative and reliable one[17]. The drawback during evaluations is basically a high risk of bias. Muddled and confusion thoughts due to correct examining of patients has marginalized the community due to limitations of therapy[18,19]. Physical distancing is the sole preventive measure and precaution adopted by the global platform[20]. Scheme 3 is a descriptive figure accounting necessary precautions to be followed during the crisis hour.

Scheme 3: Measures to safeguard individuals from the disease outbreak.

Initially treatment is being given with a combination of anti-malaria, anti-HIV, anti-swine flu medications to cure the patients of COVID. Another treatment involved use of a negative ion generator initiated by 'Airon' that helps in removing 99% of viral load. Serum plasma therapy is another approach that is extracted from cured patients of involving antibodies against the virus, but the technique is quite expensive and has begun its animal trials. Yet, no robust evidence to support convalescent plasma as a routine treatment has been laid. Use of 'hydroxychloroquine' is the basic medicine support for the cheaper treatment. The drug consumption may

help to cure but evidence supporting its robustness and adverse outcome, if not monitored within time frame can result in mistrust among communities.

Research officials are concentrating on development of a supporting vaccine. Zydus Cadila, pharmaceutical company is working on replicating the viral vector and using it in as DNA plasmid vaccine. While Bharat Biotech and FluGen, big giant industries are expecting a joint collaboration for nasal vaccine trail. Scheme 4 shows a sum up effects of being quarantine during the pandemic and its positive outlook on the society.



Scheme 4: Benefits of Quarantine implemented due to the pandemic.

Conclusion

Initially baffling decision was made in concern of outbreak after the sudden occurrence of a pandemic in haphazard fashion. A systematic approach is necessary to curb the infection along with necessary policies to be appraised by various governmental organizations in the world. To mitigate the burden on healthcare systems, it is quite vital for effective diagnosis and prognosis. Providing psychotropic medication for the pandemic has jeopardized due to lack of psychopharmacology and only policies are being put forward for quarantine. During such a disastrous situation of pandemic, internationally countries have strengthened their ties with helping each other with medical supplies, medical manpower and motivating them to fight against COVID-19. The sole intention of all major health organizations is to protect their people from pandemic via empirical and pre-emptive measures. Nevertheless, there is a long way to go in completely achieving the disease control.

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