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Novel Coronavirus (2019-nCoV) pandemic: How Far or How Close is the Solution?

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Abstract: Novel coronavirus (2019-nCoV) is a transmissible disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease was first identified in December 2019 in the capital of China's Hubei province, Wuhan. It has spread globally, resulting in the ongoing 2019-20 coronavirus pandemic. The 2019-nCoV pandemic has evolved into a global health calamity bothering almost every country and territory in the world. Various countries are in different stages of the 2019-nCoV contagion. The virus has a positive-sense single-stranded RNA genome and a nucleocapsid of helical symmetry. The genome size (27 to 34 kb) of coronaviruses is the largest among all known RNA viruses. On January 22, 2020, 2019-nCoV has been proclaimed to be originated from wild bats and belonged to beta coronavirus that has Severe Acute Respiratory Syndrome Associated Coronavirus (SARS-CoV). This pandemic has taken a heavy toll in terms of loss in human life and the global economy. A few vaccines and medicines have been developed to combat the deadly pandemic to some extent. So far, medicines such as Remdesivir, Sofosbuvir, Lopinavir, and Ribavirin have been proposed as a possible remedy for novel coronavirus. Similarly, several combination drugs available in homeopathy, allopathy, and Ayurveda (herbal formulations) have been advocated either as immune booster or medicament against coronavirus. However, a permanent solution to this pandemic seems distant due to the re-occurrence of incidence and the ever-changing behavior of the virus and symptoms caused throughout the world.

Keywords: novel coronavirus (2019-nCoV); SARS-CoV; medical potential options; Cure; Vaccines; UV radiation.

1. Introduction

A recently emerged Human coronavirus (HCoV) is clocked in December 2019 in Wuhan, China [1, 2]. According to the World Health Organization (WHO) scrutiny draft in January 2020, any person who travels to Wuhan, Hubei Province in China, is suspected to be a 2019-nCoV patient before two weeks of the onset of symptoms [1, 3, 4]. Apart from this, WHO disseminates interim prevention and control guidance [5, 6]. An unknown animal related to the seafood market is responsible for the emergence of the outbreak of 2019-nCoV, viral pneumonia [2]. According to ICMR and WHO, 2019-nCoV has four stages with different risk levels: stages of imported cases, local transmission, community transmission, and local pandemic.

Coronavirus is a member of Betacoronaviruses like the Severe Acute Respiratory Syndrome Human coronavirus (SARS HCoV) and the Middle-East Respiratory Syndrome Human coronavirus (MERS HCoV) [7, 8]. Therefore, they all show some percentage of structural similarity at the genome level. So, perhaps it is possible that the drugs' effectiveness on SARS HCoV and MERS HCoV may also be effective for 2019-nCoV. Present-day, six different strains of HCoVs have been reputed, furthermore the recently emerged 2019-nCoV [2]. SARS HCoV and MERS HCoV have a 10% and 36% mortality rate, respectively, as reported by WHO [8, 9].

According to the WHO's Situation Reports (SRs), confirmed and death cases increase day by day, not only in China but also worldwide. Confirmed cases at the date of writing this manuscript exceeded 119212530, with 2642612 deaths globally [10]. The risk of death increases at every 2019-nCoV stage. Based on the WHO report and the Centers for Disease Control and Prevention (CDC), there are no drugs or vaccines proven to be effective for the treatment or preclusion of the 2019 SARS-CoV-2 [11, 12]. The U.S. Food and Drug Administration (FDA), studies to support new animal drug development during the 2019-nCoV public health emergency [13]. But right now, vaccination processes proved to be effective by four different phases of clinical trials [14]. Multiple *in vitro* and clinical examinations started in China during the last month. It approved the first drug, Favilavir, by the National Medical Products Administration, China is proclaimed on February 18, 2020, in Zhejiang province.

China International Exchange and Promotive Association for Medical and Health Care (CPAM), for the direct antiviral treatment of SARS-CoV-2, recommends the use of lopinavir and ritonavir (undetermined dose of two capsules daily by mouth twice) in association with nebulized alfa-interferon (five million units in sterile water for injection sniffed twice daily). CPAM has based this recommendation on the use of the lopinavir and ritonavir due to their clinical benefit in the treatment of another coronavirus infection such as 2002 SARS-CoV and 2012 Middle East Respiratory Syndrome Associated Coronavirus (MERS-CoV), based on weak evidence from the historically controlled studies, retrospective cohort, case reports, and case series [15-17].

Young and healthy patients with moderate symptoms are deprecated for the use of antiviral drugs, as reported by Korean physicians. Despite that, older patients or patients with underlying conditions and serious symptoms are advised to use lopinavir- 400 mg, ritonavir-100 mg of two tablets by mouth twice daily, and chloroquine- 500 mg by mouth twice daily. If chloroquine is inaccessible, they advised the use of hydroxychloroquine- 400 mg by mouth once daily. Because of the risk of side effects, ribavirin and interferon were not suggested as first-line treatments. Despite that, the use of these drugs may be examined if treatment with lopinavir, ritonavir, chloroquine, and hydroxychloroquine are not effective [18, 19]. Homeopathy can also be a solution to this problem. We are looking at all possible options to overcome this problem, and maybe some of it works. 'Prevention is better than cure'- this slogan applies to every emerging problem. Therefore, here we discuss preventive and curative measures, which may protect the world from this pandemic. Here we also discuss the effects of UV radiation on 2019-nCoV.

2. Materials and Methods

The database of the WHO SRs was searched on February 3, 2020 at the site https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/#.

On January 30, 2020, WHO declares the 2019-nCOV outbreak in China and outside of China to constitute a public health emergency of international concern (PHEIC). There are some other sources which include the Centers for Disease Control and Prevention (CDC), and the U.S. Food and Drug Administration (FDA), China International Exchange and Promotive Association for Medical and Health Care (CPAM), Indian Council of Medical Research (ICMR), International Health Regulations (IHR), Free Press Journal (FPJ), Central Council for Research in Homeopathy (CCRH) and Ministry of AYUSH. The 3D structure/Crystal structure of 2019-nCoV main protease in an apo form in two different views was downloaded from protein databank, and the structures of remdesivir, sofosbuvir, lopinavir, and ribavirin were taken from the PubChem database.

2.1. Stages of 2019-nCoV transmission.

According to the report of WHO, which came on March 8, 2020, there are four stages of 2019-nCoV transmission [20].

Stage I: There are no cases.

Stage II: There are occasional cases - one or more, imported or locally detected.

Stage III: There are various cases that appear in time, geographical location, and common exposure.

Stage IV: There is community transmission. It is construed as the largest outbreak of local transmission.

According to the Indian Council of Medical Research (ICMR) report, which came on Saturday March 21, 2020, there are also four stages of 2019-nCoV transmission [21]. However, they are a little different from the WHO's categorizations.

Stage I: In this stage, cases are only imported from affected countries. In India's case, that is, with imported cases, only those who have traveled abroad test positive for the infection. At this stage, there is no local transmission.

Stage II: In this stage, there is local transmission occurs from an infected person who traveled abroad and tests positive. In this stage, the spread of infection can be controlled by social distancing and self-quarantine.

Stage III: In this stage, community transmission occurs. People cannot identify where they might have picked up this virus because they have not been exposed to the infected person and have no travel history to affected countries.

Stage IV: In this stage, there is a broad spread outbreak, and where it takes in the form of a pandemic within the population and difficult to control the spread of infection.

India was in stage II by mid-April 2020. After that, it is now entering stage III, according to the ICMR report, which has been updated on June 13, 2020, in the Deccan Chronicle Newspaper [22].

2.2. Genome and crystal structure of 2019-nCoV.

The CoVs encode five structural proteins in their genomes, and these are the Spike (S), Envelope (E), Hemagglutinin Esterase (HE), Membrane (M) glycoproteins, and Nucleocapsid (N) protein [23] (Figure 1).

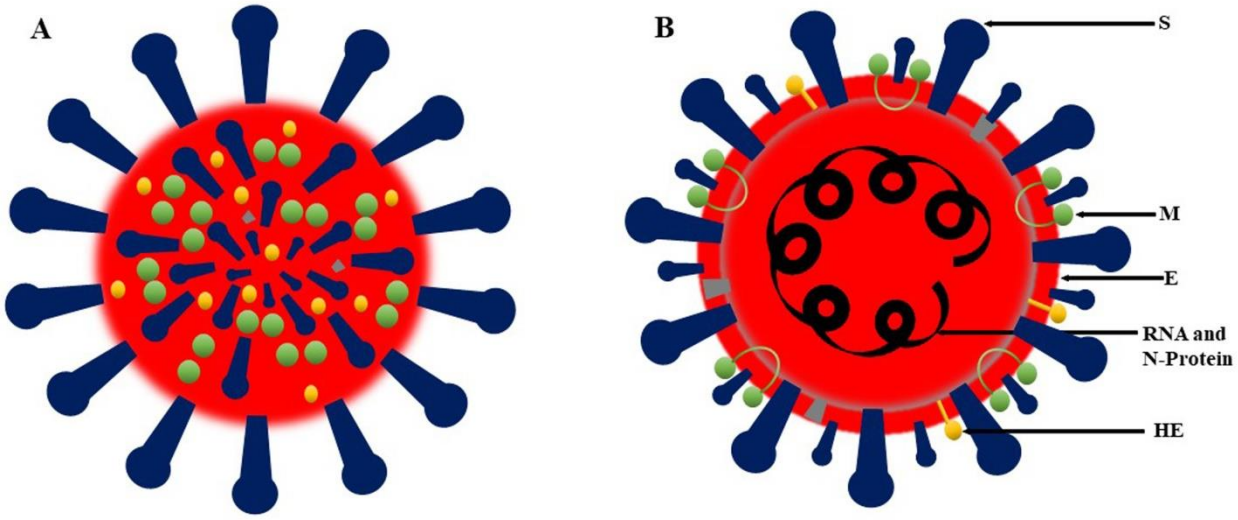

Figure 1. Virion structure of coronavirus: (**A**) External and (**B**) Internal, is shown along with their structural proteins. S: Spike glycoprotein, E: Envelope protein, HE: Hemagglutinin Esterase M: Membrane protein, and N: Nucleocapsid protein.

Except HE, all envelope proteins and N-proteins are present in all viruses, and HE are in influenza C, toroviruses, and CoV [24, 25]. On January 22, 2020, 2019-nCoV is announced to originate from wild bats and belongs to group 2 of beta coronaviruses that contain SARS-CoV. Although 2019-nCoV and SARS-CoV belong to the same betacoronavirus subgroup, similarity at genome level is only 70%. The novel group has been found to show some genetic differences from SARS-CoV [26].

S Glycoproteins: The typical shape of the virion is due to the spike glycoproteins located outside the virion; their name, coronavirus, is due to the formation of sun-like morphologies. These morphologies are from homotrimer, which is formed from S protein [27-29]. S proteins interact with M proteins bind to the virion membrane to employ bind to the virion membrane to employ the C-terminal transmembrane regions [30]. N-terminus of the S proteins helps attach virion to the specific surface receptors in the host cell's plasma membrane [31].

E Glycoproteins: E glycoproteins are small proteins made up of about 76 to 109 amino acids, in which 30 amino acids at the N-terminus of the E protein allow attachment to the virus's membrane [32]. In one study, E and M proteins of CoV were expressed together with mammalian expression vectors to form a virus-like structure within the cell.

HE Glycoproteins: HE are enveloped glycoproteins that certain viruses possess and use in invading mechanisms. It is a dimer transmembrane protein consisting of two monomers in which each monomer is consists of three domains. These domains are receptor binding domains for the attachment of HE of viral envelope to the host cell glycolipids, esterase domains for receptor hydrolysis activity, and membrane fusion domains to transfer viral genome into the host cell cytoplasm [25].

M Glycoproteins: The M glycoprotein has three transmembrane regions, and its modification occurs in the Golgi system through glycosylation [33, 34]. This modification of the M protein is critical for the virion to coalesce into the cell and build protein antigenic [35, 36]. The important role of M protein is in regenerating the virions that occur in the cell. The N protein forms a complex by binding to genomic RNA, and the M protein instigates the formation of interacting

virions in the endoplasmic reticulum-Golgi apparatus intermediate compartment (ERGIC) with this complex [33, 37, 38].

N Proteins: N proteins are phosphoproteins capable of binding to the helix, and viral genomic RNA has a flexible structure. The N protein plays the main role in virion structure, replication, and transcription of CoVs. The N protein is localized in both the replication / transcriptional region of the CoVs and the ERGIC region the virus congregates [32, 33, 37, 39].

Based on Protein Data Bank (PDB) X-ray structure validation report, the crystal structure of 2019-nCoV main protease is drawn in an apo form in two different views (Figure 2).

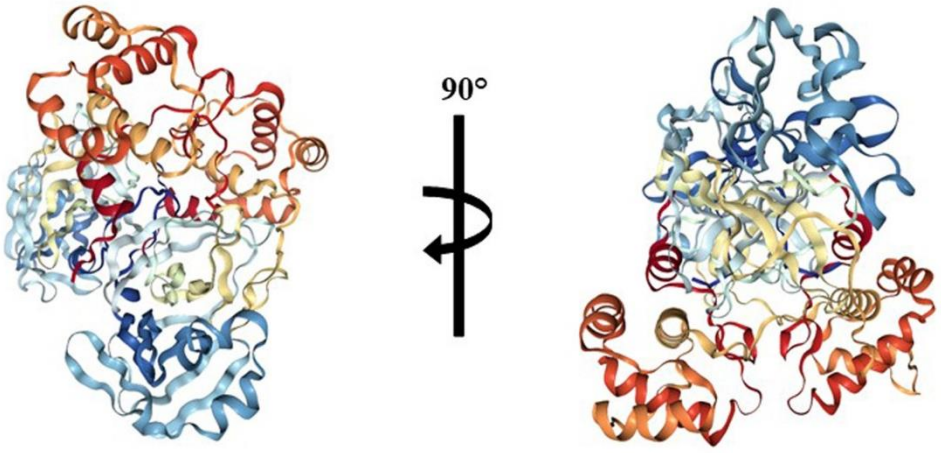

Figure 2. Crystal structure of 2019-nCoV main protease in an apo form in two different views.

This validation report comes on March 3, 2020, at 11:53 am, according to the Eastern Standard Time (EST) [40]. Based on this report, data and refinement statistics shows the number of the property with their sources. The space group is C121, cell constants (a,b,c,α,β,γ) are 113.96 Å, 53.40 Å and 45.03 Å (90°, 101.83° and 90° respectively), R_{merge} is 0.04 and R_{sym} with depositor source. Resolutions (Å) are 38.65 (2) and 48.20 (1.99) with % data completeness (in resolution range) are 99.7 and 94.6, respectively, with depositor Electronic Deposite Service (EDS) source. Wilson B-factor (Å^2) is 39.2, anisotropy is 0.203, $< I/\sigma(I) >$ is 1.23 at 2 Å and L-test for twinnings are $< |L| > = 0.50$ and $< L^2 > = 0.33$ with X triage source. The total number of a non-hydrogen atom are 2454 in the entry composition of the crystal structure of 2019-nCoV main protease and value of Å^2 is 52 with the wwPDB-VP source. Bulk solvents k_{sol} (e/Å^3), B_{sol} (Å^2) are 0.34 and 48.1, respectively and F_o, F_c correlation is 0.96 with EDS source.

2.3. Situation reports of 2019-nCoV.

In every SRs [10] and weekly epidemiological update [41] of 2019-nCoV, confirmed cases and death levels increase per day and become pandemic globally (Table 1). Since 2019-nCoV is very similar to SARS-CoV, some important features of the SARS epidemic are guiding the predictions on the current epidemic. According to the logistical modeling studies performed by combining daily numbers from 2019-nCoV cases (Figure 3) with data obtained in severe acute respiratory syndrome (SARS) epidemics, timely diagnosis is essential for quarantine and integrated interventions to control the outbreak.

Table 1. Weekly epidemiological update of 2019-nCoV in numbers, totally confirmed, and new cases till March 14, 2021 (January 21, 2020 – March 14, 2021) according to WHO, March 14, 2021 (Weekly epidemiological update - March 16 2021).

Regions	Cases		Deaths	
	Confirmed	New in last 7 days (%)	Confirmed	New in last 7 days (%)
Globally	119212530	3033213	2642612	58698
Region of America	52763406	1241439	1268186	30596
European Region	41043949	1236697	906843	20977
South-East Asia Region	13884294	199924	212355	2141
Eastern Mediterranean Region	6860070	251375	150173	2955
Region of Africa	2948236	54225	74685	1309
Western Pacific Region	1711830	49553	30357	720

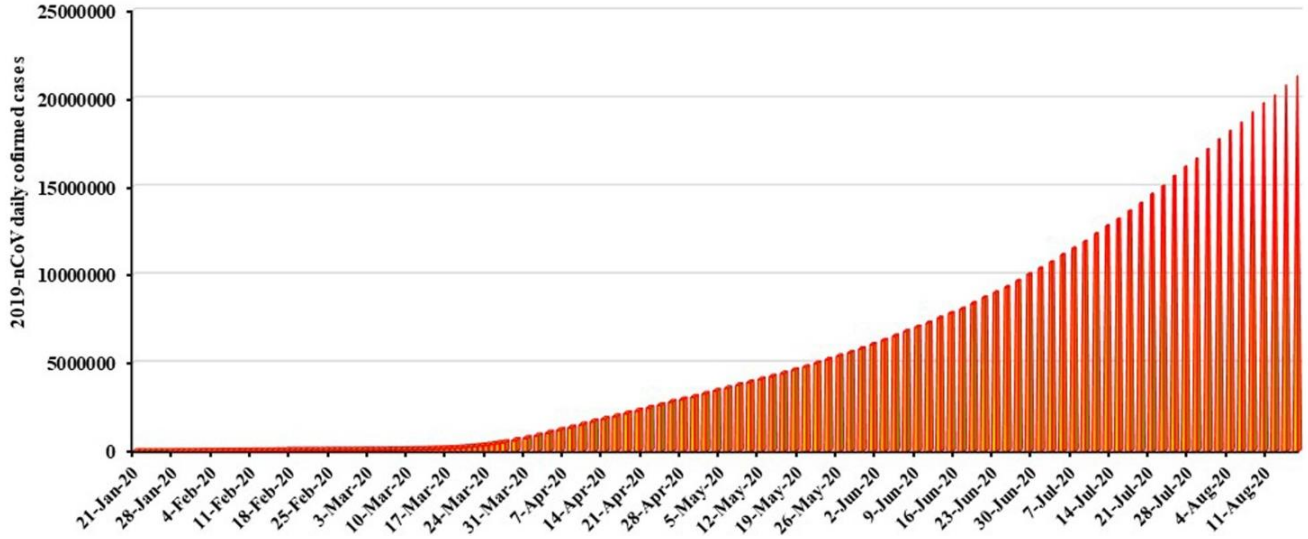

Figure 3. The number of daily new 2019-nCoV confirmed cases till August 16, 2020 (January 21, 2020 - August 16, 2020) according to WHO (Situation report - 209).

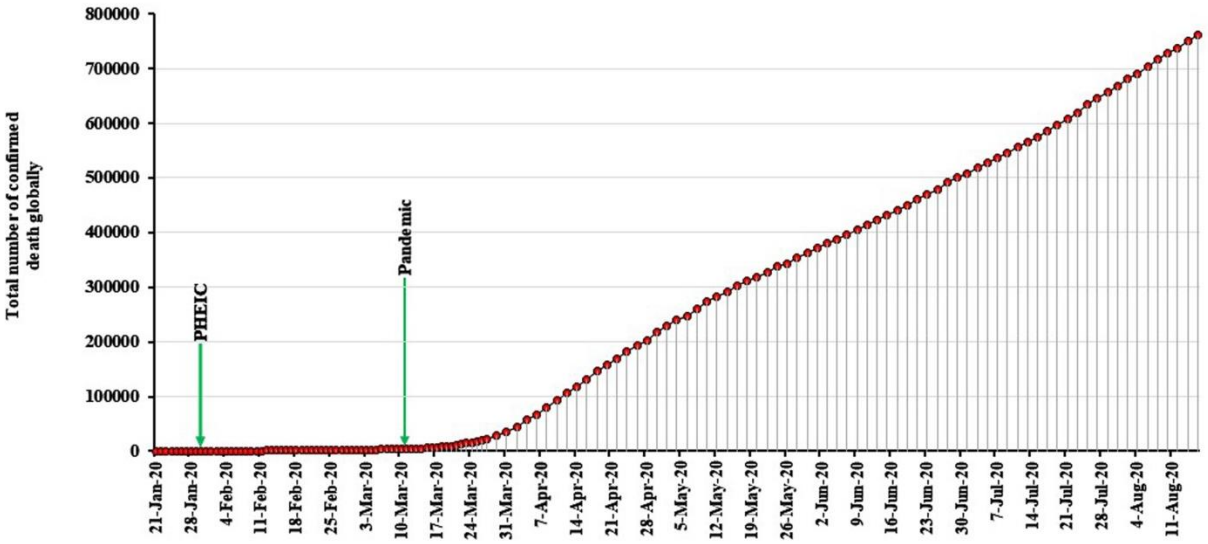

Figure 4. Total number of confirmed death globally due to the 2019-nCoV till August 16, 2020 (January 21, 2020 - August 16, 2020) according to WHO (Situation report - 209).

PHEIC (Figure 4) is an extraordinary declaration by WHO, "Which is a notable event that represents a risk to public health for other states through the international spread of the disease and potentially requires a coordinated international response" when a situation arises which is "serious, sudden, unusual or unexpected", which is public health beyond the national boundary of the affected state. Implications for and urgently require international action" [42].

Under the 2005 International Health Regulations (IHR), states have a legal duty to respond immediately to the PHEIC. This is when there was a severe outbreak of swine influenza A (H1N1) in Mexico and the United States. Countries with confirmed cases of swine flu are asked to report all possible and confirmed cases and deaths to the WHO daily. On January 30, 2020, WHO declares the 2019-nCoV outbreak in china and outside of China to constitute a PHEIC (Figure 4). On this date, in China, 7736 confirmed cases, 12167 suspected cases, 1370 severe cases, and 170 deaths were reported, and outside of China, 82 confirmed cases were registered in other 18 countries. On March 11, 2020, WHO declares the 2019-nCoV outbreak globally, prevalent all over the world, and become pandemic (Figure 4). Death level increase up to 2642612 globally due to the 2019-nCoV in 119212530 confirmed cases of 2019-nCoV (Table 1) [10].

3. Results and Discussion

3.1. A different perspective of looking at 2019-nCoV.

By binding to the heme groups in hemoglobin in our red blood cells, 2019-nCoV causes long and progressive hypoxia (low oxygen levels). Hypoxia is a state of starving our body's oxygen. People are merely desperate and losing oxygen in their blood, in the end having organ failures that kill them. Acute respiratory distress syndrome (ARDS) or any form of pneumonia is not a cause of death [43]. If there is a problem, then it also has a solution, but we have to find those solutions. In this way, oxygen sources come as a solution for the treatment of 2019-nCoV by avoiding hypoxia conditions. There are many reports coming from newspapers and organizations in different countries in favor of oxygen sources as a solution, but their limitations and their quantity and careful use are also being discussed in all. According to Chinese data suggestions, people who suffer from 2019-nCoV already have a mild disease of about 40% or moderate disease of about 40%, of which about 15% have an acute disease requiring oxygen therapy, and the remaining 5% of the critically ill will require an intensive care unit (ICU) treatment [44, 45]. This is why 2019-nCoV treatment health care facilities must be equipped with a pulse oximeter, which is operating oxygen systems, including a single-use oxygen delivery interface [46]. Oxygen therapy is equipped with medical oxygen as a healthcare intervention with some awareness and guidelines. It contains at least 82% pure oxygen, free from any contamination, and due to its high quality and medical grade, it can be given to patients.

On May 27, 2020, in 'THE ECONOMIC TIMES', the article was printed, which was related to the 2019-nCoV. Mumbaiites rent oxygen cylinders for use in a health emergency during the wait for ICU beds [47]. On June 9, 2020, in 'The Times of India', another article was printed about 2019-nCoV. Chennai: An increase in mortality was reported in Tamil Nadu. To ensure "zero delay" in the patient treatment, the state health department ordered oxygen pipes and cylinders to be placed in out-patient clinics to reduce mortality due to hypoxia because hypoxia is one of the most common complaints among younger patients [48]. On June 14, 2020, in 'hindustantimes' one

more article printed about 2019-nCoV, in which the Delhi government provide the data to show that only those patients should be admitted in the hospital who have a low level of oxygen saturation such as 90% or drops below this, but if a person has normal oxygen level such as 95 to 100%, they should take rest in home isolation [49]. So, in this continuously emerging and pandemic 2019-nCoV condition, everyone is thinking about oxygen therapy to reduce the death rate and increase the recovery rate.

3.1.1. Hyperbaric oxygen therapy.

After looking at it all above, I think that Hyperbaric Oxygen Therapy (HBOT) may be seen as a solution in the future for pandemic 2019-nCoV (Figure 5), because it has antiviral and antimicrobial properties and is already in use for HIV. It is a treatment for hypoxic and inflammatory-driven conditions that includes breathing in 100% O_2 for a set period at pressures higher than atmospheric pressure [50].

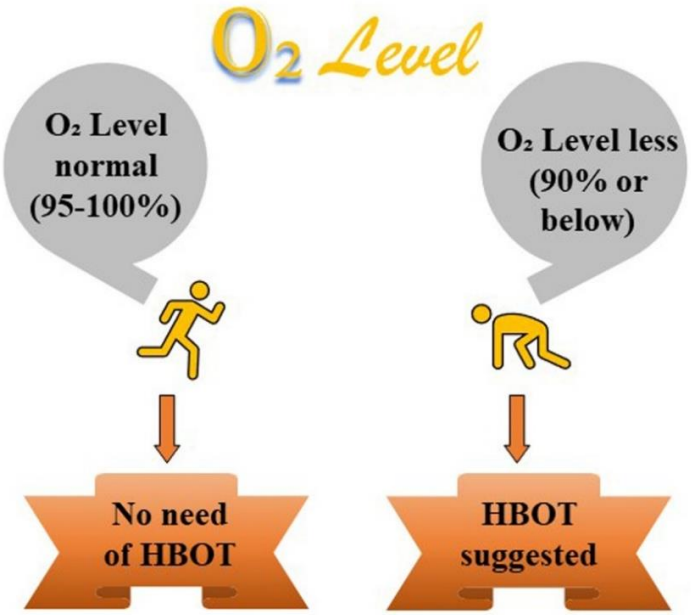

Figure 5. Oxygen level data for knowing the person-situation related to the 2019-nCoV and possible suggestion (HBOT suggested) avoids this problem in the future.

3.1.2. Plasma therapy.

Antibody-containing plasma in the blood helps to fight against foreign pathogens. When dealing with a certain type of foreign element, some blood cells act as memory cells and store maximum information. When they contact the same pathogens again, they quickly identify and degrade them by producing the same antibody, which is how it works.

According to the FDA report on May 1, 2020, in this therapy, the convalescent or healing plasma is collected from patients who have recovered from 2019-nCoV during the PHEIC condition and which form antibodies against the causative agent SARS-CoV-2. There are three main pathways currently available for the treatment 2019-nCoV through plasma therapy, which is as follows: **1.** use of 2019-nCoV convalescent plasma in registered clinical trials, **2.** use of National Expanded Access Treatment Protocol to facilitate access to 2019-nCoV convalescent plasma under

an IND protocol (21 CFR 312.305), and **3.** use of 2019-nCoV convalescent plasma to an individual patient through an emergency IND (eIND; 21 CFR 312.310) [51]. Although there are no authorized clinical trial results available for the protection or success against 2019-nCoV through the convalescent plasma therapy, according to the FDA expanded access program, early results of 5000 patients indicated that convalescent plasma transfusion in 2019-nCoV patients is safe [52].

3.2. Medical potential options.

According to the WHO, CDC, and FDA, there are currently no drugs or vaccines proven to be effective in treating the 2019-nCoV or SARS-CoV-2 [11-13]. An efficient approach to drug discovery is to test whether existing antiviral drugs effectively treat associated viral infections. Several drugs, such as remdesivir, sofosbuvir, lopinavir, and ribavirin, have been used in patients with SARS or MERS.

3.2.1. Future medical potential options include.

Remedisvir has recently been recognized as a promising antiviral drug against a wide range of RNA viruses (including SARS / MER-COV5) in cultured cells, mice, and nonhuman primate (NHP) models. At this time, it is under clinical development for the treatment of Ebola virus infection [53]. Remdesivir is an adenosine analog (Figure 6), which incorporates into nascent viral RNA chains and results in premature termination [54]. Remdesivir show s EC90 of 1.76 μM against 2019-nCoV *in vitro* [55].

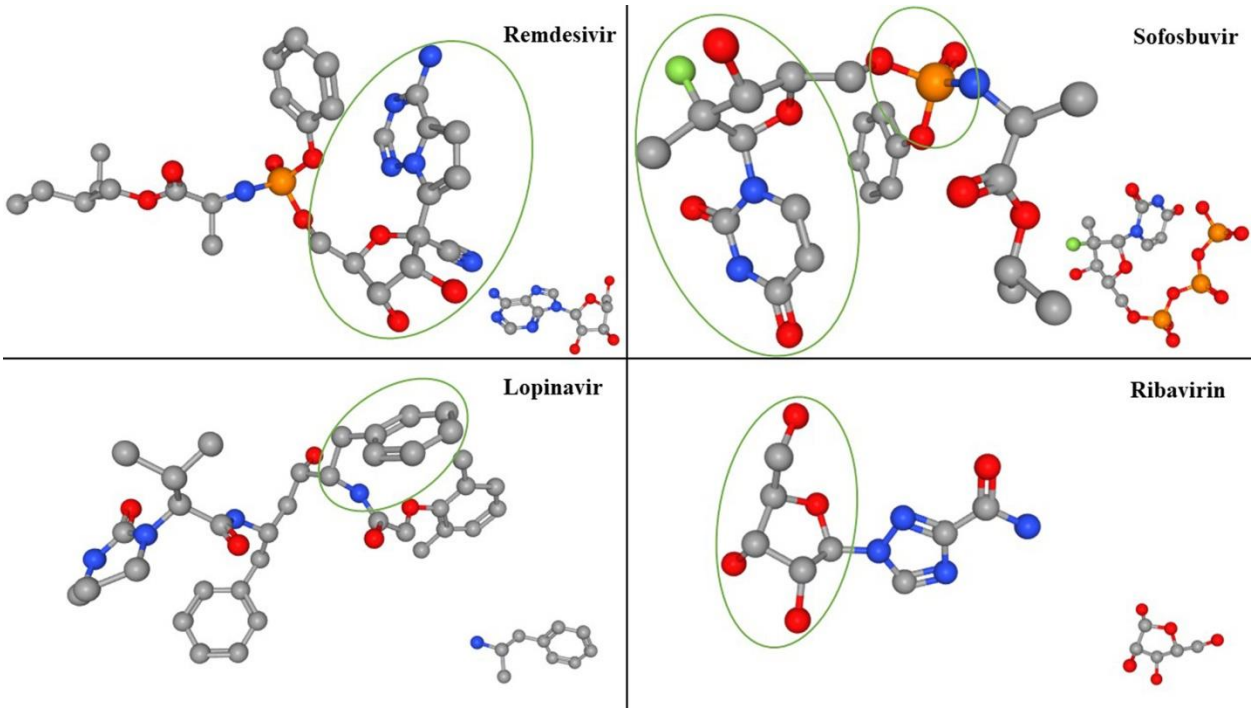

Figure 6. 3D structure of remdesivir, sofosbuvir, lopinavir, and ribavirin with their respective active site (adenosine analog, antiviral agent 2'-deoxy-2'-α-fluoro-β-C-methyluridine-5'-triphosphate, parent structure amphetamine, and nucleoside analog of ribofuranose respectively) and also indicated by the green circle in it. Their active sites also present on their right site. It shows their activity against RNA viruses. Gray color for carbon, blue color for nitrogen, red color for oxygen, orange color for phosphorus and green color for fluoride (hydrogens omitted for clarity motives).

According to Randomized Clinical Trials (RCT), on February 24, 2020, remdesivir was recruited in phase 3 in mild/moderate and in severe 2019-nCoV [56]. Several *in vitro* and clinical trials began in China during the past month, with Favilavir, the first approved drug by China's National Medical Products Administration, announced in Zhejiang Province on February 18, 2020. The FDA approves different directly acting antiviral drugs, such as sofosbuvir and ribavirin, against RNA-dependent RNA polymerase (RdRp) of the hepatitis C virus (HCV). These drugs are nucleotide derivatives that compete with the RdRp active site [57-59]. Sofosbuvir inhibits the Zika virus with its half-maximum Inhibition Concentration (IC50) of ~4 μM [60]. Molecular docking is then performed to test for some direct-acting antiviral (DAA) drugs such as Remdesivir, Sofosbuvir, and Ribavirin against RdRp 2019-nCoV. NS5B, an RdRp, is essential for the transcription of HCV RNA and its high replicative rate and genetic diversity. As a prodrug nucleotide analog, Sofosbuvir is metabolized into its active form as the antiviral agent 2'-deoxy-2'-α-fluoro-β-C-methyluridine-5'-triphosphate, also known as GS-461203 (Figure 6), which acts as a defective substrate for NS5B (non-structural protein 5B) synthesis.

3.2.2. Evaluated potential options in human clinical trials during previous coronavirus outbreaks include.

Lopinavir combined with ribavirin and corticosteroids in open-label testing in previously diagnosed 2002 SARS-CoV and 2012 MERS-CoV patients did not develop ARDS [15, 17]. Hence this combination can also be used in the treatment of 2019-nCoV because of the similarity of 2019-nCoV with SARS-CoV and MERS-CoV. Lopinavir is a dicarboxylic acid amide in which a parent structure of amphetamine (Figure 6) is substituted on nitrogen by a (2,6-dimethylphenoxy) acetyl group and on the carbon alpha to nitrogen by a (1S,3S)-1-hydroxy-3-{[(2S)-3-methyl-2-(2-oxotetrahydropyrimidin-1(2H)-yl)butanoyl]amino}-4-phenylbutyl group. An antiretroviral of the protease inhibitor class. It is used in combination with another fixed-dose protease inhibitor, ritonavir, against HIV infections. The half-maximal Effective Concentration (EC50) of ribavirin against 2019-nCoV is 109.5 μM, while its IC50 against the Dengue virus is 8 μM [55, 61]. Ribavirin is a synthetic nucleoside analog of ribofuranose (Figure 6) with activity against HCV and other RNA viruses. Ribavirin is incorporated into viral RNA. This way, it inhibits viral RNA synthesis, induces viral genome mutations, and inhibits normal viral replication.

3.2.3. Homeopathy medicine, including Arsenicum Album-30 and Camphor 1M.

According to the report of the Free Press Journal (FPJ), which was updated on May 14, 2020, the Central Council for Research in Homeopathy (CCRH), which comes under the Ministry of AYUSH says that homeopathy effective in the prevention of Coronavirus infections and recommend the usage of Arsenicum Album-30. As a precautionary action to combat the deadly coronavirus, medical practitioners in India turn to alternative medicines and talk about an Ayurvedic medicine called Zingvir-H, which was later followed by homeopathic medicine Arsenicum Album-30 has become more effective. In contrast, Zingvir-H alone is not more effective. Another homeopathic drug called Camphor 1M is gaining attention after a news channel interview with Bajaj Auto managing director Rajiv Bajaj, in which he was talking about the importance of homeopathy. He strongly believes in homeopathy and told his association with Dr.

Sankaran and Camphor 1M during his interview, where he said that this particular medicine had been given to coronavirus patients over the world and saw a faster recovery rate. In Iran, it is said that there was a time when nearly a thousand people were dying every day due to the virus. However, now due to the Camphor 1M drug, not only have deaths drastically decreased, but the number of people recovering has also doubled [62].

3.3. Prevention of 2019-nCoV.

According to the article, which was updated on healthline.com on April 8, 2020, 2019-nCoV, prevention strategies [63] are as follows:

- Wash your hand regularly with an alcohol-based sanitizer or wash them with soap and warm water for at least 20 seconds to kill the viruses after touching anything.
- Maintain a physical distance of at least 1 meter (3 feet) between yourself and others to protect yourself from other person's liquid droplets of sneezes, coughs, or speaks, because maybe it contains a virus.
- Avoid going to crowded places to maintain physical distance.
- When we cough or sneeze, we should follow the rules of respiratory hygiene by covering our mouth and nose with our elbows, tissues, or handkerchiefs.
- Stay at home and self-isolate even with minor symptoms such as cough, headache, or mild fever until you recover.
- Utilize alcohol-based disinfectant to wipe hard surfaces in your home.
- If you have fever, cough, and difficulty breathing, call the helpline numbers quickly so that your health care provider can quickly instruct you about the healthcare facility to prevent the spread of the virus.

3.4. Cure for 2019-nCoV.

3.4.1. Home remedy based.

3.4.1.1. Decoction/Kadha.

It is made with basil leaves, cinnamon bark, ginger, and black pepper, taken once or twice daily.

3.4.1.2. Golden Milk.

Take half teaspoon turmeric powder in 150 ml hot milk, once or twice daily.

3.4.2. Herbal formulation based.

3.4.2.1. Ayush Kwath.

As per the Ministry of AYUSH on April 24, 2020, a letter has been written to all the States/UTs and manufacturers of Ayurveda, Siddha, and Unani (ASU) drugs. According to this letter, the Ministry informed the people about the formulation that would be manufactured and sold with their generic name 'Ayush Kwath' or 'Ayush Kudineer' or 'Ayush Joshanda'. This formulation is manufactured with the herbs Tulsi (Basil leaves), Dalchini (Cinnamon bark), Sunthi

(dry ginger powder), and Krishna Marich (black pepper). Several reports have shown that people with weakened immune systems are easily exposed to the deadly coronavirus. In view of the importance of immune-enhancing steps in the 2019-nCoV outbreak, the Ministry intends to promote AYUSH formulations as immune boosters, which designed for health promotion, may help reduce the effects of infections and also fight against 2019-nCoV. The Ministry said that during its address to the nation on Constitution Day on April 14, PM had stated the importance of AYUSH formulation. The preparation method has also been mentioned in the letter from the Ministry of AYUSH and states that the formulation can either be dissolved in hot water or taken in tablet form. [64].

3.4.2.2. Coronil.

According to the update of Times Now Digital on June 23, 2020, Patanjali Company CEO Acharya Balakrishna has claimed that yoga guru Ramdev's company has found an Ayurvedic medicine that can help in curing the 2019-nCoV infection. According to ANI, Balkrishna said in Haridwar that "we are not talking about an immunity booster; we are talking about a cure". According to the report of Patanjali, clinical trials were carried out by Patanjali in Indore and in Jaipur after the approval of the regulator last week. He said that 2019-nCoV patients were given Ayurvedic medicine that cures in 5-14 days. They also tested negative for the virus, where we are performing only controlled clinical trials. In the next few days, evidence and data will be released by us. According to the yoga guru Ramdev, Coronil is made from a mixture of Ashwagandha, Giloy, and Tulsi and can be taken twice daily in the morning and evening [65].

3.4.3. Allopath-based.

3.4.3.1. Dexamethasone.

According to the WHO newsroom that was updated on June 16, 2020, the preliminary results of dexamethasone on 2019-nCoV patients were published, which was shared by the United Kingdom (U.K.). It stated the United Kingdom's preliminary clinical trial results for dexamethasone that it is a corticosteroid, which can act as a lifeguard for severely ill patients with 2019-nCoV, but not observed in patients with mild disease. According to preliminary U.K. findings shared with the WHO, the effect of dexamethasone for the patient on the ventilator suggests a reduction of about 1/3 in mortality, and for the patient who only needs oxygen, the death rate decreases about 1/5 [66].

3.4.3.2. Avifavir.

According to the update of The Pharma Letter (TPL) on June 11, 2020, the Russian Direct Investment Fund (RDIF), Russia's sovereign wealth fund, and drugmaker ChemRar Group declare the delivery of the first batch (60,000 courses) of Avifavir (favipiravir) to Russian hospitals in early June. Avifavir became the first favipiravir-based drug in the world for the treatment of 2019-nCoV. On June 3, 2020, the Ministry of Health of the Russian Federation included Avifavir with a registration certificate in its seventh edition guidelines for the prevention, diagnosis and

treatment of 2019-nCoV. It is marked with a Data Matrix digital code, and its authenticity can be verified by using the Honest Sign mobile app [67].

3.5. Vaccines for 2019-nCoV.

Various countries have approved vaccines such as Moderna, AstraZeneca, Sputnik V, Covishield and Covaxin, etc. India has approved three vaccines for 2019-nCoV with restricted use: Covishield, Covaxin and Sputnik V [68, 69].

3.5.1. Covishield.

AstraZeneca and the University of Oxford developed the vaccine AZD1222 against 2019-nCoV, and its Indian variant is Covishield which is developed and manufactured by the Pune-based Serum Institute of India (SII) after taking license from Oxford and AstraZeneca. Covishield is a non-replicative viral vector vaccine, which uses another weakened and genetically modified virus (common cold chimpanzee virus). The vaccine brings the code for making spike proteins, and the body's immune system has supposed to recognize this protein as a menace and work on building antibodies against it [68].

3.5.2. Covaxin.

Bharat Biotech (Hyderabad) developed a Covaxin in collaboration with the National Institute of Virology. Covaxin is an inactivated vaccine, which means that it uses the killed SARS-CoV-2 virus. It has the potential to boost an immune response without replication and infection. Covaxin is anticipated to target more than exactly the spike protein, and it also aims to develop an immune response to the nucleocapsid protein [68].

3.5.3. Sputnik V.

The Sputnik V vaccine is developed in Gamaleya National Research Center of Epidemiology and Microbiology, Russia, by using two different human adenoviruses such as Ad5 and Ad26. The efficacy of this vaccine is over 90% after two doses. With different vectors for prime and booster vaccinations, this Russian hybrid vaccine is less likely to be one stab. This induces an immune response against the viral vector, which then interferes with the other. Therefore, this vaccine is less likely to have a reduced potency [69].

3.6. Phases of clinical trials.

The four phases of clinical trials for vaccination [14] are as follows:

Phase I: After the first phase of clinical trials, the participant will help researchers understand the safety of an investigational drug. Participants may have frequent clinical examinations and laboratory work and will be asked to report any issues or side effects. These studies are often referred to as 'first in humans.'

Phase II: By joining this phase clinical trial, participants are helping researchers determine its side effects and risk factors and the effective dose of the investigational drug.

Phase III: In this phase of the clinical trial, participants will be part of a larger group of people worldwide and if participants with the disease are being studied. Participation gives researchers a clear understanding of the side effects of the investigational drug and its potential effectiveness.
Phase IV: In this phase, even after the drugs are approved for use, participants can continue to participate in long-term clinical studies designed to better understand the risks and potential benefits of the approved drug over time.

3.7. Mutated strain of 2019-nCoV.

Mutated strain or new coronavirus strain was initially discovered in the city of Kent in the United Kingdom (UK) on September 20, 2020, and then it started spreading all over the world. After laboratory studies conducted by UK scientists, it is confirmed that this mutated strain of 2019-nCoV designated as lineage B.1.1.7 is a modified version of the SARS-CoV-2 strain. It has some differences in their genetic assembly from the previously discovered strains of SARS-CoV-2. There is no need to worry because their symptoms are clearly known. Successful management and treatment measures are now available [70].

3.8. Does ultraviolet (UV) radiation have an impact on 2019-nCoV?

UV radiation damages the genome of bacteria, protozoa, and viruses, breaking bonds and creating photodimeric lesions in nucleic acids, DNA, and RNA [71]. These lesions distort the genetic material depends on the sequences that facilitate the bending of the genome [72]. In this way inhibit both transcription and replication and eventually leading to the inactivation of these organisms.

Direct UV radiation is absorbed by the nucleic acid, DNA and RNA within the region of 200 to 300 nm and damages nucleic acids with their germicidal UV region. This wavelength range also damages other cellular and viral components by performing photochemical reactions in their proteins and enzymes [73]. As we are not sure about this, but it should be thought that the effect of UV radiation on 2019-nCoV is disrupting their genome structure (RNA and protein), and it can be helpful to get out of this problem of 2019-nCoV.

4. Conclusions

Knowledge of the control of 2019-nCoV is expanding, but much remains to be discovered. Similar to the 2019-nCoV, SARS-CoV belongs to the same betacoronavirus subgroup. Their genomes are similar up to the level of 70%, but 2019-nCoV has been found to show some genetic differences from SARS-CoV. There are four stages of 2019-nCoV which become pandemic globally with every increasing stage. Forthwith, there are some specific vaccines such as covishield and covaxin or treatments for 2019-nCoV. Still, many continuing clinical trials are evaluating potential medical options for treatment. Some potential future treatment options include remdesivir, an investigational nucleoside analog. Sofosbuvir in amalgamation with ribavirin. Lopinavir; ritonavir in amalgamation with ribavirin and corticosteroids. Ribavirin in amalgamation with corticosteroids. Some homeopathic medicines include Arsenicum album-30 and Camphor 1M, which are seen as a possible alternative in the rescue of 2019-nCoV. Some other preventive and curative measures, such as Aayush Kwath, Coronil, Dexamethasone, and Avifavir,

seem possible solutions to eliminate this pandemic. The accurate effect of UV radiation on 2019-nCoV still has a question mark. There does not seem to be an immediate solution to the pandemic but looking at the development of vaccines and a series of other medicines in the next few years promises to provide exciting progress in our knowledge about 2019-nCoV and could provide a reasonable solution to this pandemic.

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Conflicts of Interest

The author declares no conflict of interest.

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