**Introduction**

Coronaviruses (CoVs) are a family of viruses that cause various respiratory and gastrointestinal diseases in mammals and birds.\(^1\) One-third of the colds in adults are also caused by human coronaviruses, which cause mild illness in many cases. These viruses bind to the antigens of the squamous cells of the respiratory tract and cause pathogenicity.\(^2-4\)

In late 2019, several cases of the COVID-19 disease were reported in Wuhan, China, with symptoms like those of severe acute respiratory syndrome (SARS). Genetic studies have shown that the virus is like the coronavirus in bats. The analyses of the virus by the World Health Organization showed that the mortality rate of the virus in China was 1.38%, where up to 13.4% being over 80 years of age.\(^5,6\) The severity of the disease was higher in older people. Also, the prevalence of the disease and its mortality rate varied in different countries.\(^7,8\) Further studies showed that the virus is transmitted through respiratory droplets from sneezing and coughing and the incubation period of the disease is about 7–14 days.\(^9\) According to the World Health Organization, by mid-July 2021, about 200 million people worldwide had been infected with the disease, of which more than four million died.\(^10\) The highest mortality rates were reported in the United States (3,12,613), followed by Brazil (5,25,417), India (3,18,417), Mexico (2,31,119), Peru (2,01,931), Russia (1,44,811), Italy (7,41,128), and England (1,28,388).\(^11\) Despite the new mutations of the virus and the sharp increase in the number of infected people, it has caused widespread panic among the people.

**ABSTRACT**

Viruses are non-living organisms that cause many problems for human societies annually. The outbreak of some dangerous viruses causing acute pneumonia has been the leading cause of death in the world. The epidemiological findings showed that the virus is developing different and dangerous species by creating new mutations, which makes it difficult to treat. The diagnosis and treatment of corona virus disease (COVID-19) has been one of the most important topics in the scientific community for the past 2 years. There are several diagnostic methods available for the detection of COVID-19 that are highly accurate and require less time. The use of some therapies such as remdesivir with basic therapy has shown high therapeutic effectiveness, but the therapeutic side effects such as decreased glomerular filtration rate, decreased lymphocyte count, respiratory failure, and increased blood creatinine levels in most treatments have been observed. The COVID-19 infection and the associated deaths are still very worrying, therefore, rapid diagnosis and timely management of this deadly infection and the necessary measures for eradicating COVID-19 are important.

**Keywords:** Coronavirus, COVID-19, diagnosis, solution, treatment

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Scientists around the world have been searching for possible diagnosis and treatment strategies since the beginning of the outbreak. In this regard, the first COVID-19 genome information was published by Professor Jung-Zhen Zhang and colleagues on January 10, 2020. However, limited information is available on the clinical diagnosis, treatment, and control of this deadly virus. So far, different results have been reported from the studies on the COVID-19 virus. Some treatments are known to be very effective in certain parts of the world, while others have had little positive effect. Regarding this issue, we intend to review the various treatment strategies and diagnostic methods for the COVID-19 virus by searching scientific databases and collecting coherent findings.

Clinical Signs of COVID-19

Coronary heart disease can be mild, moderate, severe, and critical (along with acute respiratory distress syndrome). The most common symptoms at the onset of the disease are fever, cough and fatigue, or myalgia, sputum, headache, digestive problems and fatigue have been reported. Studies show that about 32% of the patients referred to the hospital develop acute respiratory distress syndrome (ARDS), of which 30% require intensive care and unfortunately 15% of them die.

Another study shows that approximately 20–30% of the patients admitted with COVID-19 due to pneumonia need intensive care for respiratory support, of which 4.42% require the support of advanced organs with endotracheal intubation and mechanical ventilation. Although the virus primarily affects the respiratory and cardiovascular systems, neurological symptoms such as headache, dizziness, decreased sense of smell and taste, and nerve pain have been observed in the patients with severe symptoms. The radiographic evidence of chest computed tomography (CT) images has also shown mild-to-severe lung tissue damage and bilateral involvement in many patients.

COVID-19 Transmission Routes

Respiratory viruses are generally transmitted through respiration, and COVID-19 is transmitted through direct or indirect contact with airborne droplets or saliva between individuals. Of course, the amount of virus in the air is an important issue in transmitting the virus; thus, in crowded environments, viruses adhere to each other in the form of particles and are transmitted in high loads. Recent studies showed that, contrary to popular belief, hand washing is the most important factor in reducing the transmission of the virus. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is most often transmitted through microdroplets in the air, thus, paying attention to air conditioning will play an important role in reducing the SARS-CoV-2 transmission.

Diagnosis of COVID-19

Due to the lack of access to satisfactory treatment and vaccination, the management of COVID-19 depends on the timely diagnosis and standard treatment. Therefore, effective diagnostic strategies are needed for the early detection of the virus. Details of this diagnosis along with clinical manifestations are also discussed below. One of the most common approaches in diagnosing coronavirus is in vitro diagnostic methods. In general, these methods are based on two models:

1) Virus nucleic acid

The detection of viral nucleic acid by polymerase chain reaction (PCR) is strongly recommended for the confirmed diagnosis of COVID-19 and the identification of viral genetic material in the patient’s body. Real-time reverse transcription-polymerase chain reaction (RT-PCR) can be used to detect the COVID-19 nucleic acids in pharyngeal swabs, lower respiratory tract secretions, sputum, blood, feces, and other samples. In early 2020, a German scientist recommended the use of the RT-PCR test for its high accuracy in detecting SARS-CoV-2. However, a typical RT-PCR to detect the virus can sometimes be associated with false-negative results, especially in the early stages of the infection. Next-generation sequencing (NGS) is also an alternative approach that can be used to detect the Quid-19 virus and is more advanced and faster than PCR. The possible mutations in the pathogen can also be detected by NGS. However, one of the limitations of this method is a sampling of the lower parts of the respiratory tract to achieve accurate results.

Regarding the sensitivity of RT-PCR to detect COVID-19, especially in the early stages of the infection, more advanced nucleic acid detection techniques, including the isothermal method, have recently been investigated. This method was found to be suitable for detecting very small amounts of viral RNA (genetic material) and could be used as an alternative to RT-PCR. Two companies have developed rapid detection devices based on these techniques. The isothermal nucleic acid amplifier developed by Abbott under the ID Now® brand has been awarded the food and drug administration (FDA) emergency use authorizations (EUA). Another advanced nucleic acid detection technology is the use of Clustered Regularly Interspaced Short Palindromic Release (CRISPR) using countless bacterial enzymes such as caspase-12 to detect the viral genome. Compared to real-time RT-PCR, this method has better speed and sensitivity for detecting the COVID-19 nucleic acid.

Global access to accurate SARS-CoV-2 nucleic acid testing is critical to patient care, nosocomial infection prevention, and general response to the COVID-19 pandemic disease. The infectious diseases society of America (IDSA) panel evaluated the available diagnostic evidence based on recognizing the limitations and recommended nucleic acid testing for all symptomatic individuals suspected of having COVID-19. In addition, testing is recommended for asymptomatic individuals who have had known or suspected contact with COVID-19 cases.

2) Antibodies

The clinical performance data and application of SARS-CoV-2 serological tests are rapidly emerging. Based on the available evidence, the detection of anti-SARS-CoV-2 antibodies may
help confirm the presence of an infection. The panel identified three potential indications for serological testing, including (1) evaluation of patients with clinical suspicion of COVID-19 when the molecular diagnostic test is negative 2 weeks after the onset of symptoms, (2) evaluation of multisystem inflammatory syndrome in children, and (3) conducting serological monitoring studies.[28]

Immuno-assay-based kits are developed, just like rapid testing of pregnancy test strips, for the rapid diagnosis of COVID-19. This diagnostic procedure requires a significantly small sample size (10 μL of blood) with a detection time of less than 15 min. A US-based company, BioMedomics, has developed a rapid Immunoglobulin M-Immunoglobulin G-based test package that has been approved by the FDA for distribution in the United States. In addition, several other companies have developed serological test strips. Although the standard test for COVID-19 is the detection of nucleic acid by PCR, these antibody-based methods have a sensitivity and selectivity comparable to RT-PCR. These tests are recommended to be used if the RT-PCR facilities are not available.[29,30]

3) Imaging examination
As researchers have reported, CT imaging of the patient is highly recommended for diagnosing the patients. The sensitivity of the CT scan for the detection of COVID-19 appears to be 97.2%. It has been reported that CT imaging of the lesions may have major distribution in the subpleural region or be difficult to detect along bronchial vascular pathways. Generally, the morphology of the opaque areas is nodular, massive, or patchy, representing one to three lesions. In addition, it was found that the density of the masses on the bronchial wall is dense and uneven. The other symptom associated with the air-filled bronchi includes mediastinal lymph node enlargement.[31,32]

4) Hematological examination
By assessing the hematologic changes, COVID-19 can be temporarily diagnosed. Jane and her colleagues report at the onset of the COVID-19 disease that the lymphocyte count decreases and the monocyte count remains normal or increases; however, the total number of leukocytes remains normal or decreases as the disease progresses. In the cases where there is a significant decrease in the CD4+ and CD8+ cells or the absolute lymphocyte level falls below 8.8 × 109/liter, the blood count should be checked every 3 days. Similarly, increases in muscle and liver enzymes, namely myoglobin and lactate dehydrogenase, are seen in some patients. In addition, the troponin levels increase among critically ill patients. The level of inflammatory factors has been reported to be increased in both severe and critical patients.[33]

Common Treatments According to Some Studies
A study by Khan, Christian Misiday et al.[34] analyzed 92 patients admitted to the Robert Wood Johnson Hospital, 30 of whom received a standard dose of montelukast (10 mg orally once daily) on the first day of hospitalization at the discretion of their physician and 62 patients were included in the control group. The standard treatment with COVID-19-approval included 400 mg hydroxychloroquine for 5 days and azithromycin. The patients who received montelukast had significantly reduced clinical symptoms compared to the control group (10% vs. 32%). The findings showed that montelukast could reduce the clinical complications of the COVID-19 patients as a treatment. Montelukast could be a potential treatment for the COVID-19 infection.

Another study looked at the effects of lithium carbonate on nine patients with severe COVID-19 infection. All patients received hydroxychloroquine for 5 days and lopinavir–ritonavir as a combination therapy for 14 days. This finding showed that lithium carbonate significantly reduced inflammation and improved the immune response by significantly decreasing the level of C-reactive protein (CRP) response in plasma, resulting in increasing the number of lymphocytes and neutrophil cells, and thus, reducing the neutrophil to lymphocyte ratio (NLR). In these patients, the platelet to lymphocyte ratio decreased. It is noteworthy that the treatment with lithium carbonate was capable of improving all three parameters that were unchanged in the control group. No side effects were reported with lithium carbonate. They suggested that lithium carbonate therapy could be a new treatment for the COVID-19 patients.[35]

In another study, tocilizumab (TCZ), a humanized antihuman IL-6 receptor antibody, was compared with the baseline treatment of the COVID-19 disease patients. They used basic treatment for all patients including hydroxychloroquine 400 mg daily, lopinavir/ritonavir (100/400 mg twice daily), ceftriaxone (2 g for 6 days), azithromycin (500 mg daily), anticoagulant prophylaxis with enoxaparin 4000 U1 (subcutaneously once a day). TCZ was injected intravenously at a dose of 400 mg 24 h after the first injection. On day 28, clinical improvement and mortality were not statistically significant between TCZ and standard treatment. Bacterial or fungal infections were also recorded in 13% of the patients receiving TCZ and in 12% of standard treatment patients. They stated no significant improvement in the patients receiving TCZ compared to standard treatment, and the infectious side effects required close monitoring to assess the long-term risks.[36]

In the study of Beigel et al.[37] 1,062 patients were present, of which 159 were found to be in moderate condition and 903 in acute condition (oxygen saturation measured by pulse oximetry [94% or less], respiratory rate ≥24 breaths per minute). The patients were randomly assigned to receive either a dose of remdesivir (200 mg daily for 1 day, and then, 100 mg daily for up to an additional 9 days) or a placebo for up to 10 days until discharge. Their data showed that remdesivir was able to reduce the recovery time in the adults who were hospitalized with COVID-19 and had evidence of a lower respiratory tract infection from 15 to 10 days. Serious side effects such as acute respiratory failure were reported in 131 of the 532 patients in the treatment group (24.6%) and 163 of the 516 patients in the
control group (31.6%). Table 1 shows some of the COVID-19 treatments according to studies.

### Common Treatment Strategies

Despite the rapid progression of COVID-19, unfortunately, antiviral drugs have not yet been approved for the treatment of COVID-19. However, due to the sudden and widespread outbreak of the disease, there is a need to reuse the existing drugs. These drugs are often used to treat HIV, middle east respiratory syndrome (MERS), and SARS-CoV-1.

The use of the available antivirals may be the main factor in reducing the viral load and treating the infection. So far, several antiviral agents have been used to test for COVID-19 in vitro. Science protease inhibitors have significant inhibitory activity against RNA viruses. A randomized controlled trial was performed in China based on the inhibitory activity of lopinavir/ritonavir against ARDS caused by SARS and MERS. Unfortunately, the results did not differ significantly between the two randomized groups (one group treated with lopinavir/ritonavir and the other group with standard care protocols).[38]

### Antiviral Drugs

Favipiravir, remdesivir, and ribavirin are some of the most used drugs to treat COVID-19. Recently, a study was conducted on five antiviral agents to determine their activity in inhibiting COVID-19. The main method of these five drugs is to prevent the combination and replication of the virus in the Vero E6 cells, among which, remdesivir was reported to have significant antiviral activity at doses below the maximum effective concentration of 0.77 μM with the antimalarial agent chloroquine at an EC50 of 1.13 μM.[39]

The US-based Gilead Science has developed remdesivir to kill the Ebola virus, which has been used in clinical trials, where positive results in the recovery of COVID-19 disease patients. Remdesivir is currently used in the COVID-19 patients in some parts of the United States and some other countries. Regarding the significant effects of this drug against COVID-19, the National Pharmaceutical Company of Pakistan has allowed its production. Fortunately, this is the only recommended antiviral drug that can be used in patients with low oxygen saturation (below 94%) and critically ill patients with artificial ventilation. But its use is not recommended in patients with mild symptoms.[37,40,41]

Chloroquine is another common drug used against malaria and rheumatism. The remarkable anti-COVID-19 activity of chloroquine in the laboratory prompted scientists to use the drug for clinical trials against COVID-19. Chloroquine was used in human clinical trials at more than 10 hospitals in China, and the results showed that viral load, duration of illness, and prevention of pneumonia exacerbation were reported due to the drug. A possible mechanism by which chloroquine exhibits the anti-COVID-19 effects is its ability to inhibit fusion and virus entry into the host cells. However, chloroquine has not been recommended in recent clinical trials due to its toxicity.[42]

Hydroxychloroquine is another suitable option that is significantly less toxic (40% program) and has anti-COVID-19 activity comparable to its main drug. The basic antiviral mechanisms of hydroxychloroquine are to increase the endosomal pH and prevent the virus from entering the target cell. Unfortunately, in recent trials, there has been no convincing evidence to support

| Table 1: Some treatments of COVID-19 |
|-------------------------------------|
| **Foreign research**                |
| **Treatment efficiency**            |
| Death of 8 patients, clinical deterioration decreased in the & group |
| Death in the treatment group was zero and in control group 1 |
| CRP decreased, severe reduction in NLR and PLR decreased |
| Death in treatment group 5 and in control group 11 |
| Mortality was 6.7% in the treatment group and 11.9% in the control group on day 15 and 11.4% in the treatment node compared to 15.2% in the control group by day 29. The most common unpleasant side effects in at least 5% of all patients: reduction glomerular filtration rate, decrease in hemoglobin level, decrease in lymphocyte count, respiratory failure, anemia, pyrexia, hyperglycemia, increase in blood creatinine level, and increase in blood glucose level |
| **Type of population study**        |
| 92 patients (30 in the treatment group, 62 in the control group) (mean age 67 years in the treatment group, 59 years in the control group) |
| 9 people (6 people in the treatment group, 3 people in the control group). The mean age was 56 years in the treatment group and 65 years in the control group |
| 65 people (32 people in the treatment group, 32 people in the control group, mean age in the treatment group 65 years and in the control group 60 years) |
| 1062 patients (541 in the treatment group, 521 in the control group), mean age 15 ± 58.9 |
| **Treatment type**                  |
| Montelukast with basic treatment    |
| Lithium carbonate along with basic treatment |
| Tocilizumab (TCZ), a human monoclonal antibody with basic therapy |
| Remdesivir with basic treatment     |
| **References**                      |
| [14]                                |
| [15]                                |
| [16]                                |
| [17]                                |
the use of chloroquine and hydroxychloroquine in comparison with other drugs in COVID-19.[43]

According to the IDSA guidelines, hydroxychloroquine/chloroquine and the co-administration of the drug with azithromycin is not recommended among the patients admitted to the hospital with COVID-19. According to the panel, tocilizumab is recommended in addition to the standard of care (i.e., steroids) in adult patients with severely progressive or critical illness with increased markers of general inflammation, while tocilizumab should be listed as an anti-inflammatory or miscellaneous treatment among hospitalized patients with COVID-19 and is not considered as antiviral therapy.[43] It has also been suggested that treatment with baricitinib plus remdesivir plus corticosteroids can only be performed in a clinical trial.[44] In addition, no potential harm has been reported for corticosteroids. In these patients, careful design and recording of the possible outcomes for determining the dose, route, right time, and duration of such treatment are required to prevent clinical deterioration and to better understand the potential harms associated with the corticosteroids.[43] In another section, the panel states that plasma administration of improved patients is not recommended among the patients admitted to the hospital with COVID-19, but plasma administration of improved patients in mild-to-moderate outpatients is recommended only in clinical trials.[43]

Antibiotics

A randomized controlled trial in China on the combined use of hydroxychloroquine and azithromycin alone showed that combination therapy was far more successful than hydroxychloroquine monotherapy. Also, the results of a recent observational study in Michigan, USA, showed that the combined use of hydroxychloroquine and azithromycin in the COVID-19 patients was associated with a significant reduction in the viral load and mortality.[45,46]

Monoclonal Antibodies

Monoclonal antibodies (mAbs) usually alter the immune response of the host organism. This change involves a decrease in the plasma IL-6 levels and is often increased in the COVID-19 patients with mechanical ventilation. However, the exact mechanism of action of the mAbs against COVID-19 is unclear. Tocilizumab (TCZ) has been clinically proven for several autoimmune disorders. It has been evaluated for efficacy and response alone or in combination with favipiravir. There have been several randomized studies on this drug in China and the United States; some of which are still ongoing. In addition, Regeneron, in collaboration with Sanofi, is evaluating the safety and efficacy of sarilumab among hospitalized COVID-19 patients who are currently in the second phase.[47-49]

Interferon-α and Corticosteroids

Regarding the structural similarities between SARS-CoV-1 and SARS-CoV-2, -α interferon (INF-α) may be capable of enhancing the innate immunity of the SARS-CoV-2 patient. To confirm this, China has begun clinical trials for treating SARS-CoV-2 patients using combination therapy with interferon α/β (INF-α/β) and ribavirin. The use of therapeutic corticosteroids for treating and/or reducing the duration of COVID-19 infection has previously been questioned due to a lack of clinical evidence. However, the results of a study in an experiment in Michigan and a study in Greece clearly showed the beneficial effects of corticosteroids in the patients with severe COVID-19. In fact, in these patients, the disease occurs acutely due to the cytokine storm, and studies showed that corticosteroids play an important role in suppressing this storm.[50,51]

The Role of Nutrition, Vitamins, and Antioxidants in Treatment

Nutritional modification and the use of vitamin and mineral diets along with the treatment of COVID-19 patients are used in many parts of the world.[52,53]

Vitamin B

B vitamins play a major role in the body’s metabolism. Vitamin B2 deficiency is widely observed in the elderly in the United States.[53] In addition to its role in the structure of metabolic enzymes, vitamin B3 or nicotinamide is capable of killing Staphylococcus aureus through a specific transcription factor and is effective in therapeutic cases.[54] In addition, vitamin B3 can inhibit neutrophil infiltration into the lungs with a strong anti-inflammatory effect due to ventilator-induced lung damage.[55] Thus, a variety of B vitamins can be considered as viable options to reduce harmful microbes and increase the immune system in the treated patients.

Vitamin E

Vitamin E as an antioxidant by binding to the free radicals plays an important role in reducing oxidative stress.[56] The incidence of severe oxidative stress in people with severe inflammation is very high. Studies showed that taking vitamin E along with other vitamins was very significant in reducing mortality in the patients with the COVID-19 disease.[52] As a result, the use of antioxidants such as vitamin E in the diet of people exposed to the virus can be effective in boosting their immune systems.

Vitamin D

Vitamin D is responsible for modulating specific immunity to detect viruses.[56] This vitamin is capable of regulating the inflammatory responses of T helper cells by inhibiting the production of inflammatory cytokines IL-2 and interferon-gamma (INFγ).[57] Studies demonstrated that the concentration of vitamin D in the serum was decreased with age[58] and the concentration of this vitamin was found to be an important and effective factor in the COVID-19 mortality rate in the elderly. Vitamin D supplementation was also associated with increased expression of antioxidant-related genes (some enzymes such as glutathione reductase).[59] Vitamin D deficiency is associated with an increase
in the inflammatory cytokines and a significant increase in the risk of pneumonia and viral upper respiratory tract infections. Studies show that vitamin D supplementation can increase the number of T cells in the patients with coronary heart disease. Vitamin D deficiency is associated with increased thrombotic periods, and this condition is often seen in the patients with coronary artery disease, which can be reduced by prescribing this vitamin in the COVID-19 patients. Therefore, it can be reported as a suitable option to reduce inflammation and increase immune function in the treated patients due to its anti-inflammatory properties.

Zinc
Zinc is an essential substance in cellular functions and the growth and development of the body largely depend on the presence of this mineral. The immune system is greatly affected by the level of zinc in the body. Zinc deficiency can reduce the function of the enzymes, that are effective in inflammation, and impairs wound healing and chronic diseases. The brain and bone stem cells need zinc to produce and express immune-related genes such as B lymphocytes during illness. The evaluation of the effect of zinc in the patients with the COVID-19 disease showed that this mineral has been effective in reducing inflammation and their cytokine response. But safely including zinc supplements in the patients’ diets can have a beneficial effect on the prevention and treatment of the COVID-19 disease.

Nutrition and Antioxidants
Regarding the side effects of chemical drugs, the use of antioxidants and plant extracts has been considered by health organizations. Antioxidants have beneficial structures in metabolism and better cell function. Studies have shown that the use of antioxidants as adjunctive therapy in the patients with the COVID-19 disease has a beneficial effect on reducing the severity and improving secondary symptoms of the disease. The consumption of herbal antioxidants with a positive effect on the immune system, oxygen delivery, and glutathione levels in the patients with pulmonary problems reduced the mechanical ventilation time, length of stay in the intensive care unit, length of hospital stay, and mortality rate in ARDS, and its milder form, acute lung injury (ALI), and can, therefore, help the patients with the coronavirus. It is safe to say that not all antioxidants provide a 100% response to the recovery of patients with the COVID-19 disease, but this needs to be further investigated.

Development and Production of Vaccines
There were more than 120 manufacturers of the COVID-19 vaccines by May 2020, but by early 2021, more than 50 candidates for the COVID-19 vaccine were being tested on the WHO Global Clinical Trial Registration Platform. A vaccine is a useful treatment to prevent COVID-19 and suppresses the harmful or lethal clinical manifestations and dramatically reduces acute conditions. Attention to vaccination can be minimized to a large extent by preventing treatment problems. Another study found that vaccination was helpful in stimulating the COVID-19 compatible immune responses. It also was capable of increasing the protection against the development of severe and often fatal types of COVID-19. If vaccine efficacy is achieved in healthy human volunteers, it can be hoped that viral mutations will be reduced and that the spread of the COVID-19 disease will be largely controlled.

Discussion
The WHO’s statistics on the COVID-19 infection and death are still very worrying. Therefore, rapid diagnosis and timely management of this deadly infection and the necessary measures for eradicating the COVID-19 pandemic disease are very important. Proper management of the patients with COVID-19 remains an evolving preventive and therapeutic challenge, and the efficacy and safety of vaccination in cancer patients or the elderly remain unclear. Therefore, physicians are still looking for drugs to treat COVID-19. Although several of the above therapeutic factors in this study are encouraging for the treatment of the patients with COVID-19, clinical trials evaluating the definitive effect and risk of side effects are still ongoing.

RT-PCR is now used as a common technique in all countries to detect COVID-19. Alternative nucleic acid techniques such as reverse transcript, isothermal amplification reverse-transcription LAMP (RT-LAMP), and clustered regularly interspaced short palindromic repeats, as well as immunoassay devices, are in the process of being approved.

In addition, the clinicians must continuously monitor and adjust management strategies by making information available from COVID-19. However, caution should be exercised when interpreting the existing clinical data as many studies have not been controlled and reviewed. The high mortality rate and uncontrolled spread of COVID-19 have doubled the need for effective drugs and vaccines for limiting the explosive spread of the disease. All these issues show the importance and more efforts of institutions to provide effective diagnosis and treatment strategies.

Conclusion
COVID-19 is highly contagious and potentially lethal, highlighting the urgent need for the development of effective diagnostic methods, and specific antiviral therapies or vaccines. Many aspects of transmission, infection, and treatment are still unclear. Advances in the prevention and effective management of COVID-19 require more basic research and clinical interventions. Advanced methods and new biotechnologies are now available for diagnosis, but the need to use these facilities widely is felt in middle-income countries. However, due to the lack of access to vaccination in many countries and the potential inability of vaccines produced against new mutant species, the importance of finding effective drugs with the least side effects should be considered. So far, a joint effort has been made to discover optimal diagnostic and therapeutic options for clinical
applications, and the use of these options in all parts of the world should be considered by health organizations.

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