

# Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Gulf states

fatemeh keshavarzi<sup>1</sup>, Haseeb Mohammed Ali Salih<sup>2</sup>, Soran Othman Ahmed<sup>2</sup>, and Aram Noori Yara<sup>2</sup>

<sup>1</sup>Sanandaj Branch, Islamic Azad University, Sanandaj, Iran

<sup>2</sup>Department of Biology, Science and Research Branch, Islamic Azad University, Tehran, Iran

August 6, 2020

## Abstract

Abstract A Wuhan province, of China, become a first region for the novel of coronavirus infection 2019 (COVID-19), it gradually has become a major challenge for public health in most of the countries all over the world. The World Health Organization revealed that the International concerns over the novel coronavirus outbreaks have led to the formation of a public health emergency. On February 26, 2020, the COVID-19 outbreaks appeared in more than 35 countries around the world which include many of the Gulf countries notably Iran have reported COVID-19 cases respectively, and the infectious cases with a higher laboratory-confirmed and became serious as well as more deaths were reported. In this research, we elucidated the infectious pandemic significantly in all Gulf countries, additionally to investigate the competition between various of ABO blood groups which one is more susceptible than others and high risk for others with the second disease. The effects of the disease have led to the formation of control protocol centers around the world as soon as possible. According to this research and relevant guidelines to collect the necessary information and introduces essential knowledge about COVID-19 as well as prevention and treatment are the most important task in the Gulf States.

Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Gulf states

Fatemeh Keshavarzi<sup>1[?]</sup>, Haseeb Mohammed Ali Salih<sup>2</sup>, Soran Othman Ahmed<sup>2</sup>, Aram Noori Yara<sup>2</sup>

<sup>1</sup>Department of Biology, Sanandaj Branch, Islamic Azad University, Sanandaj, Iran

<sup>2</sup>Department of Biology, Science and Research Branch, Islamic Azad University, Tehran, Iran

\* Corresponding author:

Fatemeh Keshavarzi, Pasdaran Ave., Sanandaj Branch, Islamic Azad University, Sanandaj, Iran, Tel.: +98 918370 4918, Fax: +98 8733288677, [gol.keshavarzi@gmail.com](mailto:gol.keshavarzi@gmail.com)

**Abstract** A Wuhan province, of China, become a first region for the novel of coronavirus infection 2019 (COVID-19), it gradually has become a major challenge for public health in most of the countries all over the world. The World Health Organization revealed that the International concerns over the novel coronavirus outbreaks have led to the formation of a public health emergency. On February 26, 2020, the COVID-19 outbreaks appeared in more than 35 countries around the world which include many of the Gulf countries notably Iran have reported COVID-19 cases respectively, and the infectious cases with a higher laboratory-confirmed and became serious as well as more deaths were reported. In this research, we elucidated the infectious pandemic significantly in all Gulf countries, additionally to investigate the competition between various of ABO blood groups which one is more susceptible than others and high risk for others with the

second disease. The effects of the disease have led to the formation of control protocol centers around the world as soon as possible. According to this research and relevant guidelines to collect the necessary information and introduces essential knowledge about COVID-19 as well as prevention and treatment are the most important task in the Gulf States.

Keywords: COVID-19, SARS-CoV-2, Gulf countries, MERS

## Introduction

Over the past several decades, several new epidemics have been reported and emerged in particular areas, which have led to the spread of diseases such as Ebola virus disease (EVD) caused by Ebola viruses, The disease was first identified in 1976 and still around. Zika (caused by the *Zika virus*), Nipah (caused by the Nipah virus), and coronaviruses (CoVs). Recently, a new type of viral infection has emerged in Wuhan, Hubei province, China, (Hui, D. S et al, 2020), and in general, the genetic data and structurally this virus does not exactly match with the previous CoVs.

The novel CoV strain 2019, Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (China-WHO Joint Mission, 2020). However, it is believed, that the disease originated in the wild animal host (zoonotic origin) and was later transmitted to humans, the possibility that food is the source of the transmission is neither undeniable nor the right reason. Codon usage studies suggest that animal sources such as bats are more likely to be the source of the onset and spread of this novel virus(Dhama, Sharun, et al. 2020). The disease was first identified on December 12th, 2019, and has since spread globally. The World Health Organization (WHO) has published two valuable news on two different dates, including the announcement: the first one revealed On 30 January 2020 that the coronavirus outbreaks is a Public Health Emergency of International Concern (PHEIC) and on 11 March 2020 the second declaration published and revealed that the new CoV strain 2019 is a pandemic infection(Ali, Baloch, et al. 2020), which it defines as "global spread of a new disease". The pieces of evidence of local transmission and spread of the disease have also become a dangerous ring, and many countries have begun to spread awareness across the country and most of them have announced an emergency alert throughout the countries, and across all six WHO regions (Hui, D. S et al, 2020). According to various studies the most common symptoms of Covid-19 include fever, dry cough, and difficulty in breathing but Muscle pain, sputum production, diarrhea, and sore throat are less common(Singhal 2020)(Centre for Disease Control and Prevention, 2020). Although most of the result cases are mild, and some of them do not feel that he or she infected with the virus, in the progress, some symptoms such as pneumonia and congestion of some organs of the body have been reported. In March 2020, with the considering age levels and other health issues, the average rate of death per number of diagnosed cases in March 2020 was 4.4 percent; however, it ranges from 0.2 percent to 15 percent (Li et al,2020). And also have been reported in the Gulf states. Since the beginning of the spread of the disease from Wuhan, a city in the Hubei Province of China, which dates back to December 2019, a very high rate has been announced, which more than 80,000 COVID-19 cases have been reported in China. With the majority of those from Hubei and surrounding provinces (WHO). China fact-finding mission estimated that the epidemic in China had reached its peak of the spread between late January and early February 2020 (WHO Media Report, 2020. In early March, the number of cases in China dropped dramatically, however, at that time cases have been reported in all continents except for the southern hemisphere, after a while in some parts of the world the rate of infection and death is rapidly increasing. After a while, the rate of infection and death because of the COVID-19 has risen sharply, in the United States of America and many other Western European countries include the United Kingdom more cases have been reported and the disease has reached Southeast Asia, with more cases being registered daily in a country like Iran. and this has forced the countries to announce sudden lockdown(Wu, Leung et al. 2020).

The virus is typically transmitted via respiratory droplets produced through coughing and sneezing as well as through contact with contaminated objects or touching the face of an infected person (Centers for Disease Control and Prevention, 2020). Some studies have suggested that the virus may remain on different surfaces for 72 hours (National Institutes of Health, 2020).

The period between exposure and onset of the disease lasts from two days to 14 days, with an average of 5 days (Centers for Disease Control and Prevention, 2020 Zhou et al, 2020). The standard method of diagnosis is by reverse transcription-polymerase chain reaction (RT-PCR) from a nasopharyngeal swab. The infection can also be diagnosed from a combination of symptoms, risk factors, and a chest CT scan showing features of pneumonia (Jin YH et al, 2020).

On February 19, 2020, 2 people in the Qum region of Iran was admitted with atypical pneumonia that later proved to be COVID-19. In the next few days around the country were 245 more cases. This was the beginning of one of the largest and most serious clusters of COVID-19 in the Gulf states (WHO, 2020). Despite the aggressive effort, the disease continues to spread and the number of affected patients is rising in Iran and it has also become higher than that of China. Iran has recorded a higher number of cases per day and new deaths per day.

Until the preparation of this research 7 July 2020, as illustrated by a chart from the (Figure 4) the coronavirus COVID-19 has affected 215 countries and territories around the world with a total 11,749,001 cases, resulting in over 540,860 deaths but more than 6,742,622 people have recovered from this deadly virus (Worldometer, 2020).

### **Covid19 components**

SARS-CoV-2 is a single-stranded virus with the genome size is 29.891 kb long(29891 nucleotides) encoding 9860 amino acids(Cai, Tu et al. 2020). which belongs to genus *Coronavirus* and family *Coronaviridae* (Chan, Kok, et al. 2020). With the Virion size that ranging from 70 to 90 nm Spike, membrane, and envelope surface viral proteins of coronavirus are embedded in host membrane-derived lipid bilayer encapsulating the helical nucleocapsid comprising viral RNA. The genome comprises of 6–11 open reading frames (ORFs) with 5' and 3' flanking untranslated regions (UTRs) (Kumar, Nyodu, et al. 2020). classified into the subfamily *Coronavirinae* that consists of four genera *Alphacoronavirus* ( $\alpha$ CoV), *Betacoronavirus* ( $\beta$ CoV), *Gammacoronavirus* ( $\gamma$ CoV), and *Deltacoronavirus* ( $\delta$ CoV) (Cui, Li et al. 2019). As in the figure, 1 showed the high-resolution crystal structure of the virus and depicted the external components that contain four structural proteins, namely envelope (E), spike (S), membrane (M), and nucleocapsid (N). The S, M, and E proteins together form the envelope of the virus, positive-sense, spherical to pleomorphic particles, measuring between 80 and 160 nm in length(Xia, Liu, et al. 2020).

### **Comparison and history of SARSCoV1, and MERS-CoV, SARS-CoV2 (COVID-19)**

#### **SARS**

The coronavirus that causes SARS is called SARS-CoV . or severe acute respiratory syndrome, was first identified in November 2002 in the Guangdong province of southern China. It spread to 26 countries in North America, South America, Europe, and Asia before it was contained in July 2003.

The virus is thought to have spread likely from horseshoe bats (*Rhinolophus sinicus*) to civet cats — small mammals that resemble weasels — before the first human patient was infected.

Symptoms of SARS, In general, begins with a high fever ( $>38.0^{\circ}\text{C}$ ). headache, and overall feeling of discomfort and pain in the body, Some patients also suffer from respiratory distress and about 10 to 20 percent of patients suffer from diarrhea. It takes about 2 to 7 days to appear dry cough and most of them develop and suffer from pneumonia.

The incubation period for SARS is between 2 and 7 days, sometimes extending to 10 days or even in some rare cases above 14 days have been reported(Rabenau, Cinatl, et al. 2005).

CDC recommends that patients with SARS receive the same treatment that would be used for a patient with any serious community-acquired atypical pneumonia. SARS-CoV is being tested against various antiviral drugs to see if effective treatment can be found.

The risk factor: close contact with a symptomatic patient, were defined as persons who shared meals, utensils,

a residence, a hospital room, or a vehicle with a suspected SARS patient or as persons who visited such a patient in a period beginning up to 14 days before the patient's onset of symptoms. Also, persons with potential contact with the bodily secretions of a SARS patient during the patient's treatment or care were considered close contacts.

As shown in figure 2 from November 2002 through July 2003, a total of 8,098 people worldwide became sick with severe acute respiratory syndrome according to the (WHO). The total number of deaths is 774 people. By late July 2003, no new cases were being reported, and WHO declared the global outbreak to be over. For more information on the global SARS outbreak of 2003,( WHO's SARS website External) .

How long can SARS-CoV survive without the living host cell? the virus may survive in the environment for several days. The life span of the virus depends on the ability of the virus to survive under variable conditions such as material or body fluid containing and various environmental conditions such as temperature or humidity (CDC).

Treatment and prevention of the antiviral drugs used at that time against the SARS-COVID1 were Interferon and like an effective medicine(Cakebread, Xu et al. 2011).

**about a SARS vaccine** . Despite several attempts by laboratory researchers to obtain the vaccine, and then tested in animal models. No good results were found in the field of developing vaccines against the virus and they have not been able to test it on the human, and they have stopped further working because the virus disappeared very predictably. Many factors such as summer temperature and strict quarantine for the infected peoples were involved at the end of SARS-CoV-1.

## MERS

The Middle East respiratory syndrome (MERS), was first reported in Saudi Arabia in 2012. The respiratory illness is caused by a coronavirus, a distant viral cousin to SARS. It spread to 27 countries in Europe, Africa, Asia, and North America. Like many coronaviruses, MERS is a zoonotic virus, which means it is transmitted between animals and humans. According to scientists, MERS most likely passed from bats into dromedary camels before jumping to humans. Since 2012, such as in (figure 3) represented by the chart there have been 2,494 reported cases of MERS and 858 deaths from the virus. Infections occurred primarily from close human-to-human contact, according to the (WHO). The incubation period (the time between infection and start of symptoms) is about five days, but it can occasionally be up range from two to 14 days. There have been no cases of SARS for over a decade. But MERS is an ongoing public health concern.

**MERS-CoV risk factor:** the risk of severe infection for MERS-CoV is the elderly people and those suffering from the second diseases like heart disease, type one and type two of diabetes and other persons under the medical conditions like liver disease any person with this characteristics are at the risk of severe infection with MERS-CoV and the other persons under the major risk factors like caregivers, nurses and household contacts, and directly contact with camel body fluids that exposed to the virus(Alraddadi, Watson et al. 2016).

**MERS symptoms and signs :** the symptoms begin with fever and mild cough, and it often made problem in the lungs via severe shortness of breath and it made disability maintain oxygenation. Those peoples with severely affected with a fatal type of respiratory failure like adult respiratory distress syndrome (ARDS). Despite affecting the alveoli of the lungs also attacking other organs of the body such as kidneys and heart and become a problem for blood clotting and those people suffering from autoimmune diseases such as severe rheumatoid arthritis(Mailles, Blanckaert, et al. 2013).

**treatment for MERS-CoV:** Because MERS-CoV is caused by a similar virus like SARS, the management of MERS-CoV has been extrapolated from experience with the 2002 SARS outbreak and some limited experimental data. Like SARS, patients with MERS-CoV often require oxygen supplementation, and severe cases require mechanical ventilation and intensive-care-unit support. No medication has been proven to treat MERS-CoV, and treatment is based upon the patient's medical condition. Several medications have been

tried in both SARS and MERS-CoV without conclusive benefits, and further research is to be done. Management of the individual with MERS is aided by infectious disease, pulmonary, and critical-care specialists. The common antiviral drugs used at the time of infectious, against the SARS-COVID1 were like the most effective medicine. (Greenberg 2016)

**vaccine for MERS-CoV**No vaccine is commercially available at the time of writing.

## **SARS-COVID2**

Structurally described on page 4 the new coronavirus appears to be less deadly than SARS, which killed around 10 percent of people who became infected. The SARS outbreak was contained within about six months, while the COVID-19 outbreak is only a few months old at this point. Approximately 35 percent of reported patients with MERS died, but there were significantly fewer cases than either SARS or COVID-19 during that outbreak.

The new coronavirus is structurally similar to SARS, with the 96.2% genetically identity to CoVRaTG13 of a bat, but it shares 79.5% genetically identity to SARS-CoV(Hamming, Timens et al. 2004). Genetically analyses reveal that the (zoonotic) animals like bat are the origin host for the virus, and finally transmitted to humans via various unknown hosts. The virus can recognize and enter the epithelial cells of the alveoli through an angiotensin-converting enzyme (ACE2) as a receptor of the cells in the lungs and receptors on the columnar epithelial of intestinal absorptive cells. (Zhang, Du et al. 2020). Genetic analyses have also shown that the coronavirus has not undergone many significant changes since it first emerged in Wuhan. As viruses pass from person to person and spread into new geographical locations, it's not uncommon for them to mutate to avoid dying out. COVID-19 belongs to genera Betacoronavirus. Human Beta coronaviruses (SARS-CoV- 2, SARS-CoV, and MERS-CoV). but also they have significant differences in both level of genetic and phenotypic structure that can influence the ways of the infection ability. COVID-19 is containing positive single-stranded RNA attached with a nucleoprotein within a capsid composed of matrix protein. The genome of a typical CoV contains at least six ORFs. The process of translation in the sgrRNAs of CoVs translate structural and accessory proteins. Four main structural proteins are encoded by ORFs 10, 11 on the one-third of the genome near the 30-terminus.

The genetic and phenotypic structure of COVID-19 in pathogenesis is important. This article highlights the most important of these features compared to other Beta coronaviruses. ( Copyright <sup>©</sup> 2020, Taiwan Society of Microbiology). Published by Elsevier Taiwan LLC. This is an open-access article under the CC BY-NC-ND license.

Despite that the COVID-19 continuously increasing in the number of infection cases in nearly whole of the world but still COVID-19 has more significant differences like moderate transmissibility and relatively low pathogenicity with other infectious diseases such as Ebola, avian H7N9 (or bird flu virus), Severe acute respiratory syndrome coronavirus (SARS-CoV or SARS-CoV-1), or (the Middle East respiratory syndromes) MERS-CoV, respectively SARS, and MERS have significantly higher case fatality rates than COVID-19. Yet COVID-19 is more infectious — the underlying SARS-CoV-2 virus spreads more easily among people. Despite the lower case fatality rate, the overall number of deaths from COVID-19 far outweighs that from SARS or MERS.

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. The best way to prevent and slow down transmission is to be well informed about the COVID-19 virus, the disease it causes, and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol-based rub frequently and not touching your face (WHO).

## **ABO blood group, Second disease, and COVID-19 Relationship**

We are going to reveal that which person is more susceptibility to be infected with the virus some factors such as ABO blood group and second diseases such as diabetes, hypertension, and cardiovascular diseases have a

bad role and put the patient at high risk, among ABO blood groups, O is more abundant in Gulf Countries; researchers found that individuals with blood group O has a protective effect and has more ability to resistant from SARS and COVID-19 but according to, the blood group A may have more susceptibility to be infected with the virus(Zhao, Yang et al. 2020). blood group A at higher risk for SARS-CoV-2 in comparison to group O (Gérard, Maggipinto, et al. 2020). The differences between antigens that injected into the plasma membrane of the cells and other epithelial cells have significant clinical importance. The differences between the antigens of ABO blood groups make them differentially associated with several serious diseases(Cooling 2015). However, diseases like cardiovascular disorders, diabetes and IL-6, and IL-10, IL-18, make the infection with recent pandemic SARSCoV-2 become dangerous (Muniyappa and Gubbi 2020).

- In a recent study, researchers concluded that people with type A blood have a higher risk of contracting the novel coronavirus that causes COVID-19(Abdollahi, Mahmoudi-Aliabadi, et al. 2020).
- In March, a study from China concluded that people with type A blood may have a higher risk of contracting the new coronavirus than people with type O(AL-Khikani 2020).
- The experts add that past research has shown some connection between blood type and illnesses such as the stomach flu, as well as the risk of stroke and cognitive impairment(Garrison, Havlik, et al. 1976).

**VACCINE** Seventeen years after the severe acute respiratory syndrome (Sars) outbreak and seven years since the first Middle East respiratory syndrome (Mers) case, there is still no coronavirus vaccine despite dozens of attempts to develop them. Despite that many of the vaccines being developed for SARS-CoV-2 are quite different, and many use only small portions of the virus, or the virus RNA. This may circumvent the problems with SARS-CoV-1 vaccines that used more of the virus. Vaccine development has a large experimental component; we just have to make educated guesses and try different things and see what works. Hence, many different avenues for vaccines are being tested by different labs around the world. As the numbers of infections and deaths from COVID-19 continue to rise, researchers are working to identify suitable treatments and vaccines to curb the pandemic.

### **Covid-19 emerging**

A coronavirus outbreak that emerged in China in December, and is now spreading into other countries, has sickened more than ( 430,000) people and killed more than ( 19,000 ). Public health officials are racing to contain the pathogen, but this is not the first time the world has had to battle the spread of a novel coronavirus. Here's how the current situation compares to past epidemics. The new coronavirus, which causes a disease called COVID-19, was first reported in Wuhan, China. It has now spread to more than 190 countries, including South Korea, Japan, Italy, Iran, and the United States. The source of the virus has not been confirmed, but early genetic analyses suggest that the pathogen likely originated in bats and was subsequently passed to an intermediate animal before spilling over into humans

One factor that could contribute to the extent of damage that any new coronavirus can cause is globalization. As infectious disease specialist and WHO advisor Prof. David Heymann told *Medical News* in an interview: "In the past, coronaviruses that cause the common cold in humans also emerged, possibly in the same way as did the current pandemic. But they did not have the opportunity to hop on international flights and spread rapidly around the globe," he continued. "They likely circulated locally and then gradually spread to neighboring countries and onward throughout the world."

### **Covid-19 Transmission**

As the COVID-19 spreads, from the place of origin, because of the genetically and structurally relation between SARS COVID-19 and other viruses from zoonotic animals researchers have revealed that the virus has transmitted to a human, and then human to human transmission started (Chan et al. 2020; Del Rio and Malani 2020). the most common way of infection is transmitted mainly via those respiratory droplets when ejected at the time of cough, sneezing, and speaking. Close contact is another most prevalent in the process of virus transmission among the population (The Chinese Preventive Medicine Association 2020). Despite that, there may be another way with a high risk like transmission via fecal-oral transmission, as some laboratory results have recognized the virus in the stool of some patients from China and the United

States (Holshue et al. 2020). However, whether SARS-CoV-2 can be spread through aerosols or from mothers to their newborns is yet to be confirmed (Chen, Guo, et al. 2020; WHO 2020c; Zhu et al. 2020) Although patients with symptomatic COVID-19 have been the main source of transmission, and asymptomatic patients and patients in their incubation period are also carriers of SARS-CoV-2 (Chan et al. 2020; Rothe et al. 2020).because of this unique feature that COVID-19 has, put researchers in a difficult situation to find out how to control further spreading the virus, as it is difficult to identify and quarantine patients before SARS-CoV-2 occupy the whole communities (The Chinese Preventive Medicine Association 2020).the remaining source of transmission the patients in the period time of recovering (Rothe et al. 2020).

At the end of the above comparison, we concluded the approximate average mortality rate among these three infectious diseases around the world, is showing a very significant difference, as the (figure 5) vividly illustrates this aspect of the comparison for them. The average mortality rate for SARS-COVID1 by the division of death rate to the total infectious cases, that confirmed at the time of outbreak like an epidemic, the resulting of more than 8,000 with approximately 10% mortality. As figure 6 depicted that the mortality rate for SARS-COVID1 is much lower than the MERS, but when we compared it with SARS-COVID 19 we get the opposite result, despite that the SARS-COVID19 still on the ongoing and has occupied the whole world but mortality rates remaining lower.

### **COVID-19 in Gulf state countries.**

#### **Iran :**

On 19 February 2020 Iran announced that SARS-COVID 19 had arrived in the country for the first time by confirmed cases of infection in Qom and they reported that the virus may have been brought to the country by a merchant from Qom he had already traveled to China.

The government of Iran planned for the following three steps to prevent the spread of the virus: 1- Examination of incoming passengers from China and transferring suspicious cases to designated hospitals; 2- Returning the Iranian students residing in China and quarantining them for two weeks; 3- Allocation of specific funds for the provision of necessary resources, i.e. personnel, medicines, equipment, etc.

To prevent and control the spreading of the infection the government urgently decided to cancel public gatherings such as Friday prayers, they closed universities, closed schools, shopping centers, bazaars, and holy shrines, and banned festival celebrations.

Initially, they didn't quarantine entire cities and areas, howler the Government warned about continued heavy traffic between cities, notably at the time of Nowruz ceremony (the new year for many countries in the area), but still, the number of cases increase dramatically because of that they later announced a ban on travel between cities. The restrictions were gradually eased starting in April. The number of new cases fell to a low on 2 May but increased again in May as restrictions were eased, with a new peak reported on 4 June (3,574 cases just for one day) (world meter, 2020). The Iranian health minister says Iran has begun extensive work on vaccines related to the COVID-19 virus, and people will soon hear good news in this regard. two prominent teams at knowledge-based companies are working in that domain.

“We have made good progress, but it is still too early to unveil our work. In the coming days, good news will be announced about a vaccine for coronavirus,” said the minister. Meanwhile, he underlined that no definitive vaccine has been developed for the disease yet.

“So far, no specific drug has been discovered for COVID-19, and the world is working on finding a vaccine (IRAN FR NT PAGE).

According to the national guideline, Iran used, the main treatment medications include Oseltamivir (100%) (75mg twice daily) for all of the patient as a recommended medication, other medications like hydroxychloroquine used by average 94% (200mg twice daily / 400 mg single dose when combined administration with Lopinavir-Ritonavir). lopinavir/ritonavir (60%), (400 mg Lopinavir- 100 mg Ritonavir twice daily) and ribavirin (12%) also administrated by (1200 mg twice daily), Intravenous antibiotics were also used,

supplementary oxygen therapy for all patients based on their condition, and the other medicine that the patients received like the following we scripted respectively Systemic glucocorticoids, Losartan, ACE inhibitor, Levofloxacin, Vancomycin, Azithromycin, Ceftriaxone, Piperacillin-tazobactam, Meropenem, Imipenem, Ciprofloxacin. Hydroxychloroquine and lopinavir/ritonavir (in younger age group) can be potential treatment options(Ashraf, Shokouhi, et al. 2020, Motlagh, Yamrali, et al. 2020).

### **IRAQ:**

The first confirmed case was in February 2020, by the 27 march, the virus has been confirmed nearly in all of the country provinces, at that time 309 patients with a positive have been identified just in Iraqi Kurdistan region become 26% of all case, for the first time the virus came to Iraq by a student from Iran, on 22 February 2020 who studied Islamic in Najaf. On 13 March the Iraqi Kurdish region reported quarantine for two days in the two largest northern Iraq cities but after a while on 4 April KRG announce that all of the cities quarantined and declared the period of 26 February to 10 March a public holiday. Public and private universities were closed from 29 February to 10 March. This closure continued for the rest of the academic year and most started online learning. On the other hand, the Iraqi government and KRG respectively closed their border with Iran, after that, they decided to close the border with Kuwait and banned all flights with other countries of the word. According to use medicine in Iraq they are going to use four re-purposed medicines – Remdesivir, Lopinavir/Ritonavir, Interferon ( $\beta$ 1a), and hydroxychloroquine – are being evaluated

### **Saudi Arabia:**

On 27 February 2020 a Saudi nationality person returning to Saudi Arabia via Bahrain from Iran without knowing that he has infected but on 2 March, Saudi Arabia reported that the man has infected with SARS-COVID 19. This made Saudi Arabia announce a temporary lockdown of the Great Mosque of Mecca and the Prophet's Mosque in Madinah but later they decided to reopen the mosques only except for the Great Mosque of Mecca, with the very preventive health measure against the virus. To prevent further outbreaks of the infection Saudi Arabia Government announced a travel ban between the Kingdom and China, and they decided to suspend the entry of other cooperation council citizens into the country and vice versa. And later they counseled all internal flights, trains, buses, taxis for only 14 days like a big effort to obstacle the COVID19 spreading. Saudi Arabia's health ministry has approved the use of the steroid dexamethasone as part of its treatment protocol for COVID-19 patients, Saudi Press Agency reported on Wednesday Dexamethasone has been used to treat inflammation in diseases such as arthritis. (WHO) said on Wednesday it would be updating its clinical guidelines on COVID-19 treatment to include the results of the preliminary trial conducted by University of Oxford researchers

The Russian Direct Investment Fund (RDIF), the country's sovereign wealth fund which has collaborated with the Kingdom on many investment projects, is set to unveil the new drug, Avifavir, at a virtual press conference in Moscow. RDIF said that the drug, which "has shown high efficacy in treating patients with coronavirus during clinical trials," had received a registration certificate from the Russian health ministry. Our partners expressed interest in starting a clinical trial of Avifavir in the Kingdom." The affair, which disrupts the reproduction mechanisms of coronavirus, Favipiravir is a drug that has proven effective in the treatment of infected patients in China and clinical trials in Russia.

### **Oman:**

Ministry of Health announced in a statement that the virus has reached Oman on 24 February 2020 after the returning of two of the citizens from Iran with tested positive for COVID-19. In later days the number of confirmed cases with SARS-COVID 19 in the Gulf countries has increased significantly, this caused the sultanate of Oman announced some measures to fight the SARS-COVID19, these measures include reducing the number of employees in the workplace, preventing crowds in a public area and taking appropriate action against which one break the rules, they closed all exchange places, the broadcast places notably the offices and shopping where printed newspapers and magazines are published and every the same publications. They decided to close any places like shopping malls and supermarkets if they didn't install sanitizers as a

preventive measure against the spread of coronavirus. A committee was formed for dealing and responding to the developments resulting from the outbreak. On 12 March, the committee decided that tourist visas will not be issued to citizens of all countries and also stopped entry visitors. All sports events were canceled, court attendance limited to essential personnel, and the sale of shisha prohibited in restaurants and cafes. These measures were implemented on March 15 for 30 days. On 14 March, the committee decided to suspend all classes in schools, universities, and other educational institutions from 15 March for 30 days. This decision was revised in early April by the Supreme Committee and a decision was taken for the suspension to remain until further notice. Another meeting held on the next day pronounced new restrictions which included stopping the entry of foreigners apart from GCC citizens and foreign residents via all land and sea borders, quarantining all arrivals and the closures of public parks and gardens. It was also declared that Friday prayers are to be stopped and social gatherings like weddings are banned. The decisions went into effect on 17 March. Multiple museums around the country were also closed on the day indefinitely.

All places such as mosques were closed. All crowding, events, and festivals were suspended. The government banned public gatherings at all tourism sites as well as the closure of cinemas, gyms, sports clubs, barber shops, and all shops in shopping malls apart from foodstuff and medical outlets. On 21 March, legal action including detainment was taken against individuals spreading false information regarding the pandemic. Starting from 23 March, the Royal Oman Police stopped all customer services related to civil status, traffic, passports, and residency until further notice.

### **Kuwait**

On 24 February, Kuwaiti Ministry of Health announced that there were 3 cases detected coming from Iran that carry coronavirus disease 2019. The first person was a Kuwait I national, 53 years old, while the second was a Saudi national, 61 years old, and the third was a person from the stateless community.

All commercial flights were suspended on 13 March,. A public holiday was declared from 12 to 26 March, with work to resume on 29 March. Authorities saying "The doors of the mosques will stay closed" and Classes were suspended from 1 to 4 August. Arrivals at Kuwait International Airport from other countries were required to self-quarantine for 14 days. The borders with Iraq and Saudi Arabia were closed. The anti-inflammation medication will be used in Kuwait after related recommendations from (WHO). They use steroid drugs in COVID-19 treatment. "This medication is used to treat various diseases such as asthma, respiratory disorders, and rheumatism," sources at the ministry told Al Qabas newspaper.

dexamethasone reduced death rates by about a third among the most seriously ill COVID-19 hospitalized patients, WHO. Avigan, a Japanese medicine, used by Kuwait local daily Arab Times has reported. and Kuwait uses The antiviral medication Faviporavir, according to the minister. Using the drug will be by Japanese guidelines, the World Health Organization's recommendations, and Kuwait's regulations.

### **Qatar:**

On February 27, Qatar announced the first positive test of Coronavirus (COVID-19). The patient was a 36-year-old Qatari male who had been evacuated out of Iran on a government-chartered plane. Qatar locked down the country and cutting off areas with migrant workers. Parks, mosques, shops, restaurants, and other establishments were closed. Starting in mid-May, face masks became mandatory in public places. A government official said that "anyone who tests positive for coronavirus immediately receives high-quality medical treatment at no cost.

**They used medicines for treatment like the following schedule**Drug: Hydroxychloroquine + Azithromycin Hydroxychloroquine 200 mg oral tablet three times daily for 7 days + Azithromycin 500 mg ( 2 caps) oral capsules on day one then 250 mg ( 1 cap) daily from day 2-5. Other Name: HC/AZ Drug: Hydroxychloroquine + Placebo Hydroxychloroquine 200 mg oral tablet three times daily for 7 days + Placebo oral capsules 2 capsules day one then 1 cap day 2-5. Other Name: HC/Placebo Other: Placebo + Placebo

Placebo oral 1 tablet three times daily for 7days + Placebo oral capsules 2 capsules day one then 1cap day 2-5. Other Name: Control

### **Bahrain:**

The very first positive test for SARS-COVID19 was on 21 February, Bahrain confirmed the first COVID-19 cases, a school bus driver who came from Iran via Dubai. Bahrain. Bahrain suspended all flights from Dubai Airport and Sharjah Airport for 48 hours.<sup>[3]</sup> It also announced a travel ban on Iran.

all schools, nurseries, and universities for two weeks and CBSE exams were postponed.

Bahrain was one of the first countries in the world to administer Hydroxychloroquine to treat active coronavirus cases. state news agency BNA reported.

### **United Arab Emirates:**

The first patient, a 73-year-old Chinese woman, who came to the country on holiday with her family from Wuhan. The first two deaths were confirmed on March 20. On 22 March, Dubai started an 11-day sterilization campaign as an effort to contain the coronavirus. Night curfew was imposed 4 days later while the country began disinfection. School closure was first announced on March 8 for 4 weeks. 3 weeks later, it was announced that school will be closed until the end of the academic year. On 31 January, the fifth case of coronavirus in the UAE was confirmed, in someone who had traveled from Wuhan to Dubai.

The Abu Dhabi Stem Cell Center has developed a treatment method that regenerates lung cells and prevents the immune system from overreacting, Hend Al Otaiba, Director of Strategic Communications with the Ministry of Foreign Affairs, said in a Twitter thread. She said the treatment involves the extraction of stem cells from a patient's blood and reintroducing them into the lungs via inhalation of a mist. They are using Dexamethasone. The drug reduces the mortality rate of critically ill patients. The medication is of no use to corona patients with mild symptoms, but that doesn't matter. They don't require hospitalization. No medicines too, as their treatment is more symptomatic.

### **Statistics**

We are going to draw a table to further explain and compare the differences between the Gulf states in three levels of COVID 19 outbreak, and to show the majority of it across the countries. as in ( table 1 ) in the next to population number we write down in the table to be more sure that how much dangerous it is in each country separately.in the level of total cases ( table 1 ) dictates the number of confirmed cases in each country, in the next to it the mortality cases write down, and in the last of it the number of recovered cases is written, and from the ( Figure 7 ) we can get that the level of deaths according to the confirmed cases ( from the first day of infection to the day of preparing this research) in Iran and Iraq in progress, located at the top with a big difference to other Golf countries, but the death cases of Qatar recorded the lowest mortality rate, whereas Qatar has the highest level of infection according to the population number as shown in the ( Figure 8 ), and Iraq takes the lowest level of infection according to the population number.

According to the hospital clinic, the resulting of SARS-COVID19 infection in Gulf states the median age of the patients was 58 years, and the majority of the patients (72.7%) were above 50 years of age. Fever was present in 45.2% of the patients on admission. The most common clinical symptoms were shortness of breath (74%) and cough (68%). Most patients had elevated C-reactive protein (92.3%), elevated erythrocyte sedimentation rate (82.9%), lymphocytopenia (74.2 %) on admission. Lower lobes of the lung were most commonly involved, and ground-glass opacity (81.8%) was the most frequent finding in CT scans. The administration of hydroxychloroquine improved the clinical outcome of the patients. Lopinavir/ritonavir was efficacious at younger ages. Of the 70 discharged patients, 40% had symptom relapse, (8.6%) were readmitted to the hospital, and 3 patients (4.3%) died (WHO).

### **Prevention**

Prevention is the most important way to control this disease because there is no reliable. Therefore, approved or expected cases should be isolated at home, where ventilation and sunlight should be allowed. The recommended measures to prevent infection include frequent hand washing, social distancing, and keeping hands away from the face (Perlman, 2020). They must also practice cough hygiene via coughing in sleeves/tissues instead of hands, in addition to practicing hand cleaning every 15-20 min.

Wearing masks and gloves as a sanitizing protective is recommended for suspicious persons and their caregivers, and also if used by others notably those who desire make a great difference (Tang et al, 2020; Li et al, 2020). and other most effective strategies to cure the patient with confirmed positive tests are the treatment of symptoms, supportive taking care, isolation the patient from others these ways of treatment are very precious and very powerful to control the source of spreading, keeping distance between each other nearly about 2 meter is also has a great role in infection prevention. Early diagnosis, all of these measurements to lower the risk of transmission (Wang et al. 2020).

### **Diagnosis, Treatment, and medicine**

The basic ways to the diagnosis of COVID-19 are that a case from the infected area, or suspected patient and the types of information have had from the past of history, and to approach the infection diagnosis we have some scientific tests will help to identify the infection such as CT imaging findings, and laboratory tests like (reverse transcriptase-polymerase chain reaction [RT-PCR] tests on respiratory tract specimens) according to standards of either the WHO (2020a) or the National Health Commission of China (2020a). The meaning of a single negative RT-PCR test result from suspected patients is that the patient does not exclude infection. Because of some epidemiological history problems we should inform that the case may be awareness, and also if the suspected case with COVID-19 symptoms will be the way to obtain the result and also another way to diagnose is that the patient with the positive CT imaging results. And if not there has been no evidence from randomized controlled trials to recommend any specific anti-nCoV treatment, so the management of COVID-19 has been largely supportive (WHO 2020a).

First of all, to treatment, Mild illnesses should be treated at home while maintaining the ill person's body hydrated, controlling fever and cough, consuming nutrition, and using antibiotics regularly. It was suggested by China Oseltamivir Guidelines to avoid antivirals in short-term treatment; also, corticosteroids could be used in acute respiratory distress syndrome (ARDS) COVID-19. The WHO has published a detailed guide for critical care management, which could be updated according to new findings. There is no fully approved therapy for COVID-19 yet, although researches are still ongoing. Antiviral drugs, for example, ribavirin and lopinavir/ritonavir, ( Del Rio and Malani 2020). were found beneficial based on the experience from SARS and MERS. Before recommending these drugs, we need more evidence. Further medicines are suggested for pro treatments, such as chloroquine, arbidol, intravenous immunoglobulin, plasma, and interferon. in addition to using traditional Chinese herbs. Grein et al. conducted a study of using redeliver on 53 patients who received at least one dose of the medication (Amin, Florez, et al. 2018). 30 patients, 57% of the total number, needed mechanical ventilation, and 4 patients (8%) have treated with extracorporeal membrane oxygenation. The follow-up period was 18 days, where 36 patients (68%) experienced an increase in oxygen support, including 17 among 30 patients (57%) who received intubated mechanical ventilation. It was reported that 25 patients (47%) have successfully recovered, and seven patients (13%), unfortunately, died. Death cases were 18% (6 out of 34) among patients who received invasive ventilation and 5% (1 of 19) among those who did not obtain invasive ventilation. In a study by Shen et al. about administrating blood plasma therapy obtained from COVID-19 patients who had recovered, 5 patients received mechanics ventilation. After treated with plasma transfusion, body temperature became normal in 3 days for 4 out of the 5 patients, sequential organ failure assessment (SOFA) scores decreased, and PAO<sub>2</sub> / FIO increased in 12 days (range: 172-276 before and 284-366 after). Viral load also decreased and became negative within 12 days after the transfusion. From this achievement of their clinical findings, it can be concluded that the administration of plasma is quite effective, but because the sample is limited, further clinical trials are needed with larger sample size. (Chen, Xiong et al. 2020)

### **Conclusion**

At present, the outbreak of this novel Covid-19 has affected public, economic, and medical health infrastructure in almost all countries worldwide, and notably Gulf countries, on our existence from this research. we get that the virus has a great power to spread very quickly viruses and pathogens from animal origin can continue and because of the lack any specific treatment for this Virus and has a high rate of transmission between humans make the countries of the region do anything to protect themselves from the infectious, the first and the best way for protection around the Gulf countries is that remain at home and close the public areas, this type of protection has the most profound impact on further spreading the infectious. And also it is important to identify the basis of COVID 19, structure, and pathogenicity for discovering a way to the special treatment or the prevention. Due to the high similarity of the virus to its families notably like SARS-COVID 1, and MERS to further identify the virus to provide medicines and vaccines for COVID-19, and to make a barrier and avoid outbreaks diseases in the future. Ultimately, it is required for people to adhere to general cleaning teachings, the etiquette of hygiene, and avoid eating raw foods and forbidden meat.

**conflict**

none

**Data Availability Statement**

share directly with the WHO

**Table1: The difference in three levels among the countries .**

recovered	deaths	Total case	Population	Country name	Number
212176	12,305	250,458	83,987,852	Iran	1
37,879	2,779	67,442	40,218,162	Iraq	2
42686	382	52,840	4270271	Kuwait	3
158,050	2,059	220,144	34811294	Saudi Arabia	4
26,073	101	30,931	1701287	Bahrain	5
96,107	138	101,553	2880822	Qatar	6
42,282	327	53,045	9889837	United Arab Emirates	7
33,021	236	51,725	5106001	Oman	8

Figure1: The picture depicted the spherical Structure of SARS-CoV-2, external components, and viral single-stranded RNA.

Figure 2: the chart depicts the number of cases, deaths, and recoveries from the SARS-COV1 during the time of infection (November 2002 through July 2003).

Figure 3: the chart in the picture reveals the number of confirmed cases in Yellow, deaths in Red, and the recovered from the infectious depicted by Green color.

Figure 4: The chart expressing the number of confirmed cases of SARS-COVID19 around the world in Yellow, the level of deaths in the Red, and the Green column shows recovered number from the pandemic infectious disease, according to the day of preparing research.

Figure 5: In the left shown the approximate average fatality rate among SARS-COVID1 in **Yellow** with 10%, MERS in **Red** with 34%, and the ongoing SARS-COVID 19 in **Blue** color with the average 5%.

Figure 6: From the charts that belong to each infectious we also can conclude the comparison between then in the following table. it shows us an incredible result.

Figure 7: the most dangerous rate of deaths recorded in Iran and Iraq. fatality case rates in both countries are more than 4% Whereas The fatality case rates in other countries are less than 1%, notably Qatar recorded the lowest degree and located at the bottom of the level with the fatality case rate 0.1%.

Figure 8: according to the population number Qatar has the highest level of infection rate as shown by the Red column, and Iraq takes the lowest level of infection illustrated in the green column. Others like Bahrain with the rate of (0.018), Kuwait is 0.012, Oman in the level of (0.01), KSA record is 0.006, UAE at the rate of (0.005), and Iran (0.002) by the population number.

## REFERENCES

1. Munster VJ, Koopmans M, van Doremalen N, van Riel D, de Wit E. 2020. A novel Coronavirus emerging in China-key questions for impact assessment *N Engl J Med* 10.1056/NEJMp200092.1056/NEJMp20009299. doi:10
2. De Haan, C.A.; Rottier, P.J. Molecular interactions in the assembly of coronaviruses. *Adv Virus Res.* 2005, 64, 165-230, [https://doi.org/10.1016/S0065-3527\(05\)64006-7](https://doi.org/10.1016/S0065-3527(05)64006-7).
3. Bárcena, M.; Oostergetel, G.T.; Bartelink, W.; Faas, F.G.A.; Verkleij, A.; Rottier, P.J.M.; Koster, A.J.; Bosch, B.J. Cryo-electron tomography of mouse hepatitis virus: Insights into the structure of the coronavirion. *Proceedings of the National Academy of Sciences* 2009, 106, <https://doi.org/10.1073/pnas.0805270106>.
4. Roy, A.; Kucukural, A.; Zhang, Y. I-TASSER: a unified platform for automated protein structure and function prediction. *Nature Protocols* 2010, 5, 725-738, <https://doi.org/10.1038/nprot.2010.5>.
5. Duquerroy, S.; Vigouroux, A.; Rottier, P.J.; Rey, F.A.; Bosch, B.J. Central ions and lateral asparagine/glutamine zippers stabilize the post-fusion hairpin conformation of the SARS coronavirus spike glycoprotein. *Virology* 2005, 335, 276-285, <https://doi.org/10.1016/j.virol.2005.02.022>.
6. Monajjemi, M. Graphene/(h-BN)<sub>n</sub>/X-doped raphene as anode material in lithium ion batteries (X = Li, Be, B AND N). *Macedonian Journal of Chemistry and Chemical Engineering* 2017, 36, 101-118, <http://dx.doi.org/10.20450/mjccce.2017.1134>.
7. Zhang, L.; Liu, Y. Potential interventions for novel coronavirus in China: A systematic review. *Journal of Medical Virology* 2020, 92, 479-490, <https://doi.org/10.1002/jmv.25707>.
8. Sanders, J.M.; Monogue, M.L.; Jodlowski, T.Z.; Cutrell, J.B. Pharmacologic Treatments for Coronavirus Disease 2019 (COVID-19): A Review. *JAMA* 2020, 323, 1824-1836, <https://doi.org/10.1001/jama.2020.6019>.
9. Grein, J.; Ohmagari, N.; Shin, D.; Diaz, G.; Asperges, E.; Castagna, A.; Feldt, T.; Green, G.; Green, M.L.; Lescure, F.-X.; Nicastri, E.; Oda, R.; Yo, K.; Quiros-Roldan, E.; Studemeister, A.; Redinski, J.; Ahmed, S.; Bernett, J.; Chelliah, D.; Chen, D.; Chihara, S.; Cohen, S.H.; Cunningham, J.; D'Arminio Monforte, A.; Ismail, S.; Kato, H.; Lapadula, G.; L'Her, E.; Maeno, T.; Majumder, S.; Massari, M.; Mora-Rillo, M.; Mutoh, Y.; Nguyen, D.; Verweij, E.; Zoufaly, A.; Osinusi, A.O.; DeZure, A.; Zhao, Y.; Zhong, L.; Chokkalingam, A.; Elboudwarej, E.; Telep, L.; Timbs, L.; Henne, I.; Sellers, S.; Cao, H.; Tan, S.K.; Winterbourne, L.; Desai, P.; Mera, R.; Gaggar, A.; Myers, R.P.; Brainard, D.M.; Childs, R.; Flanigan, T. Compassionate Use of Remdesivir for Patients with Severe Covid-19. *New England Journal of Medicine* 2020.
10. Li, J.; Li, J.; Xie, X.; Cai, X.; Huang, J.; Tian, X.; Zhu, H. Game consumption and the 2019 novel coronavirus. *The Lancet Infectious Diseases* 2020, 20, 275-276, [https://doi.org/10.1016/S1473-3099\(20\)30063-3](https://doi.org/10.1016/S1473-3099(20)30063-3).

11. Sun, P.; Qie, S.; Liu, Z.; Ren, J.; Li, K.; Xi, J. Clinical characteristics of hospitalized patients with SARS-CoV-2 infection: A single arm meta-analysis. *Journal of Medical Virology* 2020, 92, 612-617, <https://doi.org/10.1002/jmv.25735>.
12. Poston, J.T.; Patel, B.K.; Davis, A.M. Management of Critically Ill Adults With COVID-19. *JAMA* 2020, 323, 1839-1841, <https://doi.org/10.1001/jama.2020.4914>
13. Lu H. 2020. Drug treatment options for the 2019-new coronavirus (2019-nCoV). *Biosci Trends* 10.5582/bst.2020.01020. doi: 10.5582/bst.2020.01020.
14. Pillaiyar T, Meenakshisundaram S, Manickam M. 2020. Recent discovery and development of inhibitors targeting coronaviruses. *Drug Discov Today* S1359- 6446(20)30041-6. doi: 10.1016/j.drudis.2020.01.015.
15. Ng OW, Tan YJ. 2017. Understanding bat SARS-like coronaviruses for the preparation of future corona virus outbreaks-Implications for coronavirus vaccine development. *Hum Vaccin Immunother* 13(1):186-189. doi: 10.1080/21645515.2016.1228500.
16. Chen J. 2020. Pathogenicity and transmissibility of 2019-nCoV-A quick overview and comparison with other emerging viruses. *Microbes Infect* S1286-4579(20)30026-5. doi:10.1016/j.micinf.2020.01.004.
17. WHO. 2020. World Health Organization. Coronavirus disease 2019 (COVID-19) situation report, Situation report – 33 (22nd February 2020). Available online: <https://www.who.int/docs/default-source/coronaviruse/situationreports/20200222-sitrep-33-covid-19.pdf> (accessed on 25 February 2020).
18. Chen Y, Liu Q, Guo D. 2020. Emerging coronaviruses: genome structure, replication, and pathogenesis *J Med Virol* 10.1002/jmv.25681. doi:10.1002/jmv.25681.
19. Zhu N, Zhang D, Wang W, et al; China Novel Coronavirus Investigating and Research Team. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med*. 2020;382(8):727-733. doi:10.1056/NEJMoa2001017
20. US Food and Drug Administration. Investigational COVID-19 Convalescent plasma: emergency INDs. Updated April 3, 2020. Accessed
21. World Health Organization. Clinical management of severe acute respiratory infection when COVID-19 is suspected. Updated March 13, 2020. Accessed March 18, 2020. [https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected)
22. Arabi YM, Mandourah Y, Al-Hameed F, et al; Saudi Critical Care Trial Group. Corticosteroid therapy for critically ill patients with Middle East respiratory syndrome. *Am J Respir Crit Care Med*. 2018;197(6):757-767. doi:10.1164/rccm.201706- 1172OC
23. Seah I, Agrawal R. Can the coronavirus disease 2019 (COVID-19) affect the eyes? A review of coronaviruses and ocular implications in humans and animals. *Ocul Immunol Inflamm* 2020: 1-5
24. Du L, He Y, Zhou Y, Liu S, Zheng B-J, Jiang S. The spike protein of SARS-CoVda target for vaccine and therapeutic development. *Nat Rev Microbiol* 2009;7(3):226e36
25. "UAE CORONAVIRUS (COVID-19) UPDATES". UAE's national emergency crisis and disaster management authority. Retrieved 15 April 2020.
26. Reynolds, Matt (4 March 2020). "What is coronavirus and how close is it to becoming a pandemic?". *Wired UK*. ISSN 1357-0978. Archived from the original on 5 March 2020. Retrieved 5 March 2020
27. World Federation Of Societies of Anaesthesiologists – Coronavirus". [www.wfsahq.org](http://www.wfsahq.org) . Archived from the original on 12 March 2020. Retrieved 15 March 2020

28. "Qatar reports 951 new confirmed cases, 114 new recovered cases of COVID-19". *www.iloveqatar.net*. Retrieved 27 May 2020.
29. "Qatar reports first case of coronavirus". *www.thepeninsulaqatar.com*. Retrieved 20 May 2020.
30. "Saudi Arabia announces the first case of coronavirus". *Arab News*. Riyadh: Saudi Research and Marketing Group. 3 March 2020. ISSN 0254-833X. Archived from the original on 2 March 2020. Retrieved 4 April 2020. Saudi Arabia reported its first case of the new coronavirus on Monday amid growing fears that a surge in the number of those infected in Iran is threatening the whole region.
31. Jump up to:<sup>a b</sup> "Live Updates: Elite Saudi Hospital Braces for a Wave of Royal Patients". *The New York Times*. 8 April 2020. Archived from the original on 22 April 2020. Retrieved 8 April 2020
32. "Covid 19 Dashboard: Saudi Arabia". Archived from the original on 6 June 2020. Retrieved 10 June 2020.
33. Elsevier. "Novel Coronavirus Information Center". Elsevier Connect. Archived from the original on 30 January 2020. Retrieved 15 March 2020.
34. Turak, Natasha (29 January 2020). First Middle East cases of coronavirus confirmed in the UAE *CNBC.com*. Retrieved 19 March 2020.
35. Elsevier. "Novel Coronavirus Information Center". Elsevier Connect. Archived from the original on 30 January 2020. Retrieved 15 March 2020.
36. Reynolds, Matt (4 March 2020). "What is coronavirus and how close is it to becoming a pandemic?". *Wired UK*. ISSN 1357-0978. Archived from the original on 5 March 2020. Retrieved 5 March 2020
37. "Kuwait suspends work in gov't departments March 12-26 - spokesman". *Kuwait News Agency*. 11 March 2020.
38. "Kuwait gov't imposes partial curfew - MoI". *Kuwait News Agency*. 21 March 2020.
39. "Kuwait gov't extends curfew, imposes lockdown on two areas - Min. Al-Saleh". *Kuwait News Agency*. 6 April 2020.
40. "Kuwait announces tom. (Friday) start of Ramadan". *Kuwait News Agency*. 23 April 2020.
41. "Strict conditions for restaurants and its workers". *Arab Times Kuwait*. 22 April 2020.
42. [<https://www.moh.gov.bh/> "Coronavirus COVID-19 - Summary of cases"]. *Ministry of Health*. Retrieved 11 June 2020.
43. Jump up to:<sup>a b c d e</sup> "Bahrain coronavirus case No. 1: A school bus driver". *gulfnews.com*. Retrieved 29 February 2020.
44. Elsevier. "Novel Coronavirus Information Center". Elsevier Connect. Archived from the original on 30 January 2020. Retrieved 15 March 2020.
- 45 Reynolds, Matt (4 March 2020). "What is coronavirus and how close is it to becoming a pandemic?". *Wired UK*. ISSN 1357-0978. Archived from the original on 5 March 2020. Retrieved 5 March 2020.
46. Wright, Robin. "How Iran Became a New Epicenter of the Coronavirus Outbreak". *The New Yorker*. Archived from the original on 3 March 2020. Retrieved 7 March 2020.
47. Jump up to:<sup>a b c</sup> "Iran Coronavirus". *Worldometer*. Archived from the original on 9 March 2020. Retrieved 23 March 2020.
47. Jump up to:<sup>a b c</sup> "Iran Coronavirus". *Worldometer*. Archived from the original on 9 March 2020. Retrieved 23 March 2020.
48. Jump up to:<sup>a b c</sup> "Iran Reports Its First 2 Cases of the New Coronavirus". *New York Times*. Archived from the original on 19 February 2020. Retrieved 19 February 2020.

49. Jump up to:<sup>a b c</sup> "How Iran Became a New Epicenter of the Coronavirus Outbreak". *The New Yorker*. Archived from the original on 3 March 2020. Retrieved 5 March 2020.
50. Monajjemi, M.; Shahriari, S.; Mollaamin, F. Evaluation of Coronavirus Families & Covid-19 Proteins: Molecular Modeling Study. *Biointerface Res. Appl. Chem.* 2020, 10, 6039-6057, <https://doi.org/10.33263/BRIAC105.60396057>.
51. Roy, A.; Kucukural, A.; Zhang, Y. I-TASSER: a unified platform for automated protein structure and function prediction. *Nature Protocols* 2010, 5, 725-738, <https://doi.org/10.1038/nprot.2010.5>.
52. Molecular Operating Environment (MOE), 2019.01; Chemical Computing Group ULC, 1010 Sherbrooke St. West, Suite #910, Montreal, QC, Canada, H3A 2R7, 2019.
53. Báez-Santos, Y.M.; Barraza, S.J.; Wilson, M.W.; Agius, M.P.; Mielech, A.M.; Davis, N.M.; Baker, S.C.; Larsen, S.D.; Mesecar, A.D. X-ray Structural and Biological Evaluation of a Series of Potent and Highly Selective Inhibitors of Human Coronavirus Papain-like Proteases. *Journal of Medicinal Chemistry* 2014, 57, 2393-2412 <https://doi.org/10.1021/jm401712t>.
54. Li ZY, Meng LY. 2020. Prevention and control of new coronavirus infection 2020] in press. doi:10.3760/cma.j.issn.1002-0098.2020.0001 Andersson L, Andreassen JO, Day P, Heithersay G, Trope M, DiAngelis AJ
- Kenny DJ, Sigurdsson A, Bourguignon C, Flores MT. 2012. International
55. Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth. *Dent Traumatol.* 28(2):88–96.
56. Centers for Disease Control and Prevention. 2020. Disease burden of influenza; [accessed 2020 Feb 25]. <https://www.cdc.gov/flu/about/burden/index.html>.
- Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, Xing F, Liu J, Yip CC, Poon RW, et al. 2020. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *Lancet.* 395(10223):514–523.
57. National Health Commission of China. 2020a. The diagnosis and treatment protocol for novel coronavirus pneumonia (interim sixth edition) [accessed 2020 Feb 19]. <http://www.gov.cn/zhengce/zhengceku/2020-02/19/content>
58. The Chinese Preventive Medicine Association. 2020. An update on the epidemiological characteristics of novel coronavirus pneumonia (COVID-19). *Chin J Epidemiol.* 41(2):139–144.
59. Abdollahi, A., et al. (2020). "The Novel Coronavirus SARS-CoV-2 Vulnerability Association with ABO/Rh Blood Types." *Iranian Journal of Pathology*: 156-160.
60. AL-Khikani, F. H. O. (2020). "The role of blood group in COVID-19 infection: More information is needed." *Journal of Nature and Science of Medicine* 3(3): 225.

61. Ali, S. A., et al. (2020). "The outbreak of Coronavirus Disease 2019 (COVID-19)—An emerging global health threat." *Journal of infection and public health*.
62. Alraddadi, B. M., et al. (2016). "Risk factors for primary Middle East respiratory syndrome coronavirus illness in humans, Saudi Arabia, 2014." *Emerging infectious diseases* 22(1): 49.
63. Amin, P., et al. (2018). "Regulation of a distinct activated RIPK1 intermediate bridging complex I and complex II in TNF $\alpha$ -mediated apoptosis." *Proceedings of the National Academy of Sciences* 115(26): E5944-E5953.
64. Anvari, M. S., et al. (2009). "ABO blood group and coronary artery diseases in Iranian patients awaiting coronary artery bypass graft surgery: a review of 10,641 cases." *Laboratory Medicine* 40(9): 528-530.
65. Ashraf, M. A., et al. (2020). "COVID-19 in Iran, a comprehensive investigation from exposure to treatment outcomes." medRxiv.
66. Bener, A. and M. Yousafzai (2014). "The distribution of the ABO blood groups among the diabetes mellitus patients." *Nigerian journal of clinical practice* 17(5): 565-568.
67. Cai, H., et al. (2020). "Psychological Impact and Coping Strategies of Frontline Medical Staff in Hubei Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID19) in Hubei, China." *Med Sci Monit* 26: e924171.
68. Cakebread, J. A., et al. (2011). "Exogenous IFN- $\beta$  has antiviral and anti-inflammatory properties in primary bronchial epithelial cells from asthmatic subjects exposed to rhinovirus." *Journal of Allergy and Clinical Immunology* 127(5): 1148-1154. e1149.
69. Chan, J. F.-W., et al. (2020). "Genomic characterization of the 2019 novel human-pathogenic coronavirus isolated from a patient with atypical pneumonia after visiting Wuhan." *Emerging microbes & infections* 9(1): 221-236.
70. Chen, L., et al. (2020). "Convalescent plasma as a potential therapy for COVID-19." *The Lancet Infectious Diseases* 20(4): 398-400.
71. Cooling, L. (2015). "Blood groups in infection and host susceptibility." *Clinical microbiology reviews* 28(3): 801-870.
72. Cui, J., et al. (2019). "Origin and evolution of pathogenic coronaviruses." *Nature Reviews Microbiology* 17(3): 181-192.
73. Dhama, K., et al. (2020). "Coronavirus disease 2019–COVID-19."
74. Fagherazzi, G., et al. (2015). "ABO and Rhesus blood groups and risk of type 2 diabetes: evidence from the large E3N cohort study." *Diabetologia* 58(3): 519-522.
75. Garrison, R., et al. (1976). "ABO blood group and cardiovascular disease the Framingham study." *Atherosclerosis* 25(2-3): 311-318.
76. Gérard, C., et al. (2020). "COVID-19 & ABO blood group: another viewpoint." *British journal of haematology*.
77. Greenberg, S. B. (2016). *Update on human rhinovirus and coronavirus infections. Seminars in respiratory and critical care medicine*, Thieme Medical Publishers.
78. Hamming, I., et al. (2004). "Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis." *The Journal of Pathology: A Journal of the Pathological Society of Great Britain and Ireland* 203(2): 631-637.
79. Jassim, W. (2012). "Association of ABO blood group in Iraqis with hypercholesterolaemia, hypertension and diabetes mellitus." *EMHJ-Eastern Mediterranean Health Journal*, 18 (8), 888-891, 2012.

- 80.Kearney, P. M., et al. (2005). "Global burden of hypertension: analysis of worldwide data." *The lancet* **365** (9455): 217-223.
- 81.Kumar, S., et al. (2020). Morphology, Genome Organization, Replication, and Pathogenesis of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). *Coronavirus Disease 2019 (COVID-19)*, Springer: 23-31.
- 82.Mailles, A., et al. (2013). "First cases of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) infections in France, investigations and implications for the prevention of human-to-human transmission, France, May 2013." *Eurosurveillance* **18** (24): 20502.
- 83.Motlagh, A., et al. (2020). "COVID19 prevention & care; a cancer specific guideline." *Archives of Iranian Medicine* **23** (4): 255-264.
- 84.Muniyappa, R. and S. Gubbi (2020). "COVID-19 pandemic, coronaviruses, and diabetes mellitus." *American Journal of Physiology-Endocrinology and Metabolism* **318** (5): E736-E741.
- 85.Okeke, C. O., et al. (2018). "Variations in activated partial thromboplastin time and prothrombin time in individuals of A, B, AB, and O blood groups." *Iraqi Journal of Hematology* **7** (2): 85.
- 86.Rabenau, H., et al. (2005). "Stability and inactivation of SARS coronavirus." *Medical microbiology and immunology* 194(1-2): 1-6.
- 87.Singhal, T. (2020). "A review of coronavirus disease-2019 (COVID-19)." *The Indian Journal of Pediatrics*: 1-6.
- 88.Wu, J. T., et al. (2020). "Estimating clinical severity of COVID-19 from the transmission dynamics in Wuhan, China." *Nature Medicine* 26(4): 506-510.
- 89.Xia, S., et al. (2020). "Inhibition of SARS-CoV-2 (previously 2019-nCoV) infection by a highly potent pan-coronavirus fusion inhibitor targeting its spike protein that harbors a high capacity to mediate membrane fusion." *Cell research* 30(4): 343-355.
- 90.Zhang, W., et al. (2020). "Molecular and serological investigation of 2019-nCoV infected patients: implication of multiple shedding routes." *Emerging microbes & infections* **9** (1): 386-389.
- 91.Zhao, J., et al. (2020). "Relationship between the ABO Blood Group and the COVID-19 Susceptibility." medRxiv.

#### Hosted file

figure 2.docx available at <https://authorea.com/users/346013/articles/474273-coronavirus-disease-2019-covid-19-emerging-and-future-challenges-for-gulf-states>

#### Hosted file

figure 1.docx available at <https://authorea.com/users/346013/articles/474273-coronavirus-disease-2019-covid-19-emerging-and-future-challenges-for-gulf-states>

#### Hosted file

figure 3.docx available at <https://authorea.com/users/346013/articles/474273-coronavirus-disease-2019-covid-19-emerging-and-future-challenges-for-gulf-states>

#### Hosted file

figure 4.docx available at <https://authorea.com/users/346013/articles/474273-coronavirus-disease-2019-covid-19-emerging-and-future-challenges-for-gulf-states>

#### Hosted file

figure 5.docx available at <https://authorea.com/users/346013/articles/474273-coronavirus-disease-2019-covid-19-emerging-and-future-challenges-for-gulf-states>

**Hosted file**

figure 6.docx available at <https://authorea.com/users/346013/articles/474273-coronavirus-disease-2019-covid-19-emerging-and-future-challenges-for-gulf-states>

**Hosted file**

figure 7.docx available at <https://authorea.com/users/346013/articles/474273-coronavirus-disease-2019-covid-19-emerging-and-future-challenges-for-gulf-states>

**Hosted file**

figure 8.docx available at <https://authorea.com/users/346013/articles/474273-coronavirus-disease-2019-covid-19-emerging-and-future-challenges-for-gulf-states>