

Challenges Facing Iraq to Tackle the Spread of COVID-19: An Overview



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ABSTRACT

On the 31st of December 2019, China reported several pneumonia-like infections in Wuhan's Huanan Seafood Wholesale Market. Ten days later, a novel coronavirus (2019-nCoV) was announced by the Chinese center for disease control (CCDC). At that time, the genome sequence was publicly made available. The genome sequence analysis of the newly identified virus was found similar to 75-80% of the SARS-CoV clade and more than 88% of bat corona viruses. On January 30th, the World Health Organization (WHO) declared a state of emergency due to the COVID-19 epidemic. In March 2020, the WHO raised a state of emergency and declared that COVID-19 has become a pandemic. Unfortunately, Iraq confirmed the first cases of COVID-19 in February 2020. On April 25th, 46,135 tests were conducted in Iraq with 1763 positive cases. Although Iraq is making great efforts to contain the COVID-19 pandemic stimulating all the available capabilities, such as having a full lockdown and teaching people about the sickness danger, the numbers of cases and deaths started to dramatically increase in June. Now, on the 2nd of July, the infection and death cases were around 54 K and 2.2 K, respectively. Herein, we outline the challenges that the Iraqi health sector is facing to control the spread of COVID-19 with procedures followed so far. This could assist in understanding the severity of the situation and end up with a realistic understanding of it.

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1. BACKGROUND

Corona virus has been first discovered in the 1960s and known as 229E and OC43 [1]. Since then, other kinds of corona virus have been identified, such as SARS-CoV in 2003, HCoV NL63 in 2004, HKU1 in 2005, MERS-CoV in 2012, and SARS-CoV-2 in late 2019, and caused infections among human. The infection by these types were usually associated with serious respiratory infections [2].

Recently, extensive researches, case studies, and reports were conducted attempting to provide a solid understanding of the virus structure, binding mechanism, and methods of cure.

2. STRUCTURE of The SARS-CoV-2

Coronaviruses (and noroviruses) are categorized according to their crown or halo-like shape of the envelope glycoproteins, structural chemistry, and replication process they undergo.

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Similar to all types of coronaviruses, SARS-CoV-2 possesses a spherical shape that contains proteins spikes on their surface. The envelope is composed of a lipid bilayer, in which the membrane (M), envelope (E), and spike (S) proteins structures are identified. Within the envelope, the nucleocapsid (N), which consist of several copies of the nucleocapsid protein can be found. These nucleocapsids are attached to the single-stranded RNA genome as a beads-on-a-string type conformational structure [3]. The spikes on the virus's surface bind strongly to human cells, therefore, a structural alteration occurs to allow the viral membrane to fuse with the cell membrane. Once the virus penetrates inside the host and copy genes, and generating further viruses [4].

The researchers used cryo-electron microscope (cryo-EM) to take detailed pictures of the structure of the spike protein as depicted in Figure 1. This involves freezing virus particles and applying a stream of high-energy electrons through the sample to create tens of thousands of images [5].

3. EPIDEMIOLOGY

Coronaviruses are part of the family Coronaviridae that has different types, including alphacoronavirus, betacoronavirus, deltacoronavirus, and gammacoronavirus, as well as several subgenera and species [6]. The recent coronavirus appeared firstly among humans in Wuhan City, China as mentioned earlier, this

has been named as SARS-CoV-2 [2]. DNA sequencing exhibited that SARS-CoV-2 is somehow similar to betacoronaviruses observed in bats (88% sequence identity). Nevertheless, it is slightly different from the earlier coronavirus, SARS-CoV (79% sequence identity). The main contrast between the two viruses is in one amino acid at certain portions of the genome units originated by pangolins and others from humans. However, until now, data showed that around 92% similarity in the genetic structure between pangolin coronavirus and SARS-CoV-2. Hence, a solid evidence at the moment demonstrates that pangolins are the middle hosts [7].

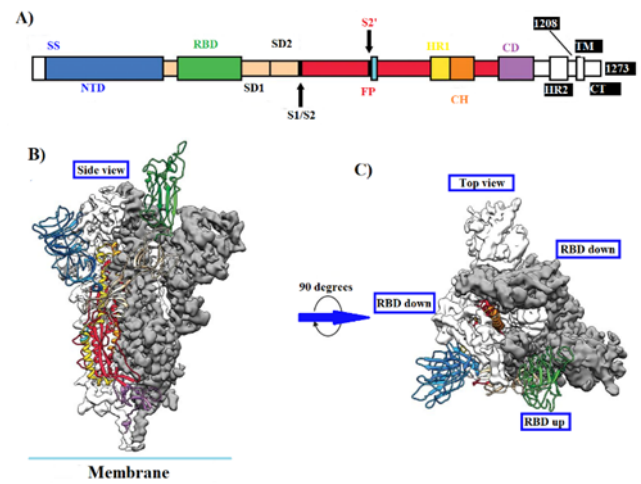


Fig:1: A: The primary structure of the SARS-CoV-2 indicated by domains of various colours.

White colour indicates the domains that cannot be structurally viewed. SS = signal sequence, S2'= S2' breakage site of protease, FP = fusion peptide, HR1, HR2 = heptad repeat 1 and 2 respectively, CH = central helix, CD = connector domain, TM = transmembrane domain, CT = cytoplasm tail. The black arrows indicate the sites of the possible protease breakage. shows the protein spikes that the virus uses to bind to the human cell. B) and C) are the side and top view of the SARS-CoV-2 structure respectively. The RBD down protomers are indicated in C) have been appeared in cryo-EM in white and grey colours. Whereas, other colours are indicative of the other RBD up protomers as shown in their corresponding colours in Figure A). The figure is from Ref [5] with the license no. 4890700979598

4. PATHOGEN

The 2019-nCoV is known as the pathogen causes the COVID-19 which has identified in early 2020, also known as SARS-CoV-2 [8]. Recently, it was reported that SARS-CoV-2 could be formed in bats. This has been ascribed to the fact that its DNA sequence resembles other CoVs [9]. Scrutinizing its chemical structure, it is suggested that the receptor-binding portion is composed of a core unit and another exterior subdomain. Similar to SARS-CoV, SARS-CoV-2 also use the Angiotensin-converting enzyme 2 (ACE2) as an entry receptor in the ACE2-expressing cells, which is most abundant in the type II alveolar cells of the lungs. On the other hand, the virus leads to serious myocardial and chronic damages to the cardiovascular system [10].

5. TRANSMISSION

COVID-19 can spread by droplets and fomites when infected and non-infected persons come to proximity. The lifecycle of the COVID-19 is similar to SARS-CoV virus and was portrayed in Figure 2 [11].

WHO and the US research centers for disease control (CDC) explicitly explained that it is mostly spread via close contact (less than 2 m. distance) and tiny droplets from people coughing, sneezing, and talking to others [12]. Both sputum and saliva are considered as serious virus carriers. Another possible way for virus spreading is when people touching a contaminated surface and then touching eyes or faces, known as fomite transmission. The virus survives for hours to days on surfaces. Specifically, the virus was found to be detectable for one day on cardboard, three days on plastics (polypropylene) and stainless steel (AISI 304), and for up to four hours on 99% copper. This, however, varies depending on the humidity and temperature of the surrounding [13].

6. SYMPTOMS

Some infected people might be asymptomatic or show flu-like symptoms such as fever, cough, fatigue, and shortness of breath. 97.5% of patients show symptoms in 11.5 days of infection [14]. However, this disease can range from no symptoms (asymptomatic) to severe pneumonia and death. Therefore, we can classify the symptoms according to their strength as summarized in Table 1.

Table 1: The classification of the virus infection based on the severity of the symptoms

mild	moderate	severe
Headache	Shortness of breath	Fever
Nasal congestion	Loss of smell	Dry cough
Pink eyes	Muscle or joint pain	Fatigue

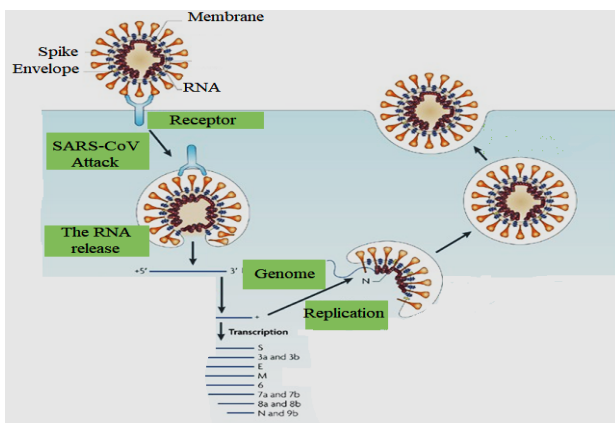


Fig:2: The life cycle of SARS-CoV virus in its host cells. Figure from Ref. [11]

7. COVID-19 in Iraq

Iraq, in addition to six Arabic countries (Lebanon, Bahrain, Kuwait, Oman, Qatar, and Saudi Arabia), received COVID-19 primarily from people who have been in the Islamic Republic of Iran. Intermittent outbreaks of SARS-COV-2 took place in various countries other than China soon after the outbreak in Wuhan city. However, luckily, so far none of the aforementioned Arabic countries witnessed the peaks as Iran did. In fact, Iran has been considered as the second epicenter of COVID-19 according to WHO reports [15]. The epidemic in Iran began in Qom, a city with population of 1.2 million; however, this city accepts approximately 20 million visitors annually to do religious rituals from various Muslim countries, including Iraq. This has been an adverse effect to many of the Arabic countries when those visitors to Iran came back to their native countries.

COVID-19 in Iraq was firstly identified on the 24th of February 2020 in the south of Baghdad at Al-Najaf city. Two weeks later, the Iraqi Ministry of Health (MOH) broadcasted that 101 cases have been tested positive of COVID-19 with 9 deaths cases in 14 provinces; Baghdad city had around 40% of those cases. This is suggestive of the fast-paced spread of COVID-19 across the country. Iraqis who visited Iran during the spring break mostly exposed to the infection of COVID-19 [16]. Those infected people were the spark for virus spreading in the country, since no compulsory quarantine procedures were placed at that time. Nevertheless, Iraq closed its border with Iran in late February, but only allowed Iraqi citizens to return back home, after the pandemic in Iran has already widely spread. Between the 8th and 16th of March, trading with Kuwait was suspended.

8. CHALLENGES FACING IRAQ

Considering the current capacity of the Iraqi health sector, there is no doubt that Iraq will not be able to tackle COVID-19 challenges without a support from the international community. This stems from the fact that the Iraqi MOH will not be able dealing with such pandemic due to the lack of intensive care unit (ICU) beds, medical equipment, and qualified quarantine centers. Additionally, the health staff and workers need to be well trained to have the required experience and face such a pandemic. Likewise, other Arabic countries could face the same problem, which may increase the threat in the whole Middle East region.

It is worth noting here that COVID-19 testing kits were only available in one research center in Baghdad city. Thus, sending suspected cases from other Iraqi provinces may take up to 24 hours, which may expose those patients to health complications or even death.

Unfortunately, the lack in ambulance vehicles restricted the medical staff, as well as patients, to access urgent and emergency medical services. This cause more serious consequences as patients arranged a private transport to reach hospitals. In fact, this could spread the virus more within public due to the innocence of people in dealing with such an infection sickness. Here, it is recommended to not go to the hospital unless the individual is in serious conditions.

It was found, not only in Iraq but worldwide, that there is a lack in personal protective equipment (PPE) quantities. In the case of Iraq, many health care workers, nurses, and doctors were obliged to purchase their PPE by themselves. This resulted two burdens; one is financial because of the increased prices of those PPE due to the high demand and the shortage in supply. Second, and most important, is a safety burden as there is no guarantee that these types of equipment were imported from trusted suppliers. Regardless the quality, it was very hard to find those PPE, hand sanitizers, and disinfectants.

Due to the sociable Iraqi personality and increased population density in some places, people kept on practicing their traditions and habits via shaking hands, exchanging kisses between relatives and friends, and attending social gatherings, wedding ceremonies, wakes, and funerals. These were great challenge for the MOH, social media, and media to convince people to stop practicing these habits to plummet the spread of COVID-19. In this regard, Iraqi ministry of interior by all its efforts has been engaged to assist with the prohibitions of any social gathering within cities and suburbs. Later on, the government ordered all unnecessary facilities to have a full lockdown to stop the spread with exempting health workers, doctors, and media personnel. Nevertheless, there were several reported cases of rules violation in different places within the country.

Bacterial infections such as, pneumonia and sepsis were also considered as big challenges during the COVID-19 pandemic. These bacterial infections necessitate effective treatment to include some empirical antibiotics. This was considered as a serious danger to patients due to development of an antibiotic resistance as reported in the literature [11].

The challenges articulated herein were the main rationales for the Iraqi government to ask for assistance from countries which were successful in controlling the spread of COVID-19. Therefore, assistance has been requested from the Chinese government to provide some necessary equipment for testing, facemasks, gloves, sanitizers, and disinfectants due to the incapacity to provide them domestically. At this stage, China answered the Iraqi request for help in a prompt manner, and further support is expected to come from other countries, such as the United States and WHO.

It was promising that due to the lockdown of unnecessary gatherings, activities, and religious activities, the infection has become almost steady. Unfortunately, by the end May 2020, the coronavirus cases started to rise up and by the beginning of Jun a sharp increase happened without reaching the curve top. Until the time of writing this paper, the situation is going worse day by day. After this fearful increase, more challenges appeared, such as the lack in oxygen bottles, hospitals' beds, and mechanical ventilators.

9. OVERVIEW OF CASES IN IRAQ

All information was notified or reported by the World Health Organization. Cases have been confirmed in all 18 Iraqi provinces on March 27th, with the Iraqi Kurdistan region accounting for 309 (26%) of total cases. On the 8th of April, the number kept increasing and the total confirmed cases were 1434, deaths 80, and recovered 856. The highest cases numbers recorded on the 16th of April 2020 as listed in Table 2 [17].

Table 2: The number of infections by provinces in Iraq including Kurdistan autonomous region as reported by Iraqi health officials on the 16th of April 2020

Province	Ceases	Death	Recovered
Baghdad	292	27	166
Najaf	255	5	132
Basra	187	16	81
Erbil	170	0	107
Sulaymaniyah	134	5	106
Karbala	79	6	50

More updated results based on reports from the Iraqi association for medical research and studies (IAMRS) accessed on the 28th of April 2020 [18] revealed that the total number of positive cases increased to 1928, total deaths of 90, and 1319 cases recovered and discharged from hospitals. The report added that within 24 hours prior to the report, 81 new cases were added and 33 cases have been

completely recovered [19]. This means that COVID-19 has not been controlled at that time even with the lockdown and the current restrictions. Expected results of uncontrolled disease are presenting now in June 2020, where a terrifying increase in all numbers is noted. At this stage, it is recommended to keep restrictions with no reduction until the country reaches the stage of controlling the infection. More importantly, further monitoring of cases and other procedures, such as avoiding social gathering, maintaining social distancing, and taking care of personal hygiene, are necessary to be followed [20, 21].

10.CONCLUSIONS

In conclusion, it can be seen that the number of cases was not high in compared to other countries especially in the Middle East region. However, the situation deteriorated and a state of emergency could be declared in the next days. Nevertheless, these numbers could increase in the near future. The challenges facing the health sector in Iraq has been outlines herein, and further action needs to be taken by the government, as well as to include the pandemic and control the infection. As researchers are taking their role in investigating SARS-CoV-2 in Iraq [22, 23], more efforts are needed to overcome this challenging issue.

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Conflict of interest

Authors declare no conflict of interest.

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التحديات التي تواجه العراق للتصدي لانتشار COVID-19

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الخلاصة:

في 31 ديسمبر 2019، أبلغت الصين عن العديد من الإصابات الشبيهة بالالتهاب الرئوي في سوق Huanan للمأكولات البحرية في مدينة ووهان. بعد عشرة أيام، أعلن المركز الصيني لمكافحة الأمراض (CCDC) عن فيروس كورونا الجديد (nCoV-2019). في ذلك الوقت، تم اعلان تسلسله الجينومي للجمهور، حيث تم تحديده مشابهًا لـ 75-80٪ من كليب SARS-CoV وأكثر من 88٪ مشابهًا لفيروسات كورونا الخفافيش. في 30 يناير، أعلنت منظمة الصحة العالمية (WHO) حالة الطوارئ بسبب وباء COVID-19. في مارس 2020، رفعت منظمة الصحة العالمية حالة الطوارئ وأعلنت أن COVID-19 أصبح وباءً. لسوء الحظ، أعلن العراق عن ظهور أولى حالات الإصابة بـ COVID-19 في فبراير 2020. وفي 25 أبريل، تم إجراء 46135 اختبارًا في العراق ووجد 1763 حالة إيجابية. على الرغم من أن العراق يبذل جهودًا كبيرة لاحتواء جائحة COVID-19 باستنفار جميع القدرات المتاحة، مثل الإغلاق الكامل وتعليم الناس مخاطر المرض، إلا أن أعداد الحالات والوفيات بدأت في الارتفاع بشكل كبير في يونيو. إلى حد آخر تحديث لهذا العمل، في الثاني من يوليو، كانت حالات الإصابة والوفاة حوالي 54 ألف و2.2 ألف على التوالي. في هذا العمل، نعرض التحديات التي يواجهها القطاع الصحي العراقي للسيطرة على انتشار COVID-19 بالإجراءات المتبعة حتى الآن. والذي يمكن أن يساعد في إدراك خطورة الموقف وينتهي بفهم واقعي له.