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Prevalence of SARS-CoV-2 infections in Iraq

Hasan Salam Hassoon[1*], Dhuha Kadhim Madhi[2] and Batool A. Alshebly[3]

[1,2,3]Department of Biology, College of Sciences, University of Misan, Iraq
[1]hasan.salam@uomisan.edu.iq, [2]Dhuhakadhim322@uomisan.edu.iq and [3]batoolalshibli@uomisan.edu.iq
Corresponding Author*: hasan.salam@uomisan.edu.iq

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ABSTRACT
SARS-2 is a RNA virus refers to Coronaviridae that cause respiratory infection in humans. SARS emerged in China in December 2019 and spread worldwide that cause COVID-19 pandemic. The aims of this study are to explore the COVID-19 in Iraqi Provinces and determine some parameters including number of SARS-2 infection, dead and recovery. The study is motivated by the reasons of high SARS-2 existence in some cities more than other cities. Here, the data were collected and then analyzed statically by SPSS software. The finding shows that tourist provinces are high in SARS-2 infections including North area of Iraq. Also, some cities located on the east border of Iraq are also high in SARS-2 infections. In conclusion, there are many thousands of infections with this virus due to some factors that effect on SARS-2 transmission in Iraqi cities.

Keywords: SARS-2, infection, Public Health Directorate.

1. INTRODUCTION:

Coronaviruses (CoVs) cause a variety of diseases in humans and animals including birds, domestic animals and other mammals [1,2]. Coronaviruses can infect respiratory systems such as Infectious bronchitis virus (IBV), Severe Acute Respiratory Syndrome 1(SARS-1), Middle East Respiratory Syndrome (MERS) "Camel flu" [3] and SARS-CoV-2 (COVID-19), known as 2019-nCoV [4–6]. Coronaviruses also causes enteric diseases [7], and some of coronaviruses replicate at other sites of the body, liver, spleen and central nervous system [8,9]. According to ICTV, *Coronavirdea*, subfamily, *Orthocoronavirus* are classified into four Genera [10,11] including: *Alphacoronavirus* that infect human, pigs, cats, dogs and bats. The second genera is *Betacoronavirus*, that including SARS-CoV-1, China 2003, MERS-CoV, Saudi Arabia 2012 & SARS-CoV-2, China 2019. The third Genera is *Gammacoronavirus*, such as IBV, which infected chicken and turkey. The last Genera is *Deltacoronavirus*, the species of this Genera infect mammalians and birds [12]. All coronaviruses are zoonotic viruses except the genera of *Gammacoronavirus* that infect animals only which induced membrane rearrangement in infected cells [13,14].

In general, the virion of SARS-CoV-2 coronaviruses is oval or spherical in shape with size around 70-90 nm [10,15]. The viral genome is monopartite, linear and ssRNA, positive sense, [10,16] with size up to 32 Kb. This genome consisting of 4-5 structural proteins along with non-structural and host cell-derived proteins. All coronaviruses encode Nucleocapsid (N), Spike (S), Envelope (E) and Membrane (M) structural proteins, some also have a hemagglutinin–esterase (HE) protein. The genomic RNA of SARS-CoV-2 is associated with the N protein to form the nucleocapsid in helical appearance. The spikes formed of S protein give the virion crown-like morphology, which coronaviruses derived it name [17–19] .

The first coronaviruses was isolated in 1963 in United States, and until now, there are some species of coronaviruses were discovered that cause mild cold-like symptom infection in human including coronaviruses NL63, HKU1, OC43, and 229F. Additionally, SARS-CoV and MERS-CoV are also infecting human and cause pneumonia and in some cases these viruses cause death in infected patients [4,5]. A novel coronavirus named as sever cute respiratory syndrome-coronavirus-2 (SARS-CoV-2) cause humans respiratory infection that originated in Wuhan city, China, December 2019. Later, in January 2020, SARS-CoV-2 was identified as causative agent of pneumonia infections in humans [20]. SARS-CoV-2 spread to cause pandemic outbreak at the rest of the world including, North and South America, Europe, Australia, Africa, Asian countries and Middle East. The reports show that the numbers of SARS-CoV-2 infection are increasing in Iraq and globally [21–23]. Until now, there is no specific treatment for SARS-2, only some medical plants were used to reduce the clinical signs that caused by SARS-2[24].

2. MATERIAL AND METHODS:

2.1 Data collection

The data of this research were collected from the formal COVID-19 announcement that issued by Iraqi Ministry of Health/Public Health Directorate, available on http://www.phd.iq. The report of Public Health Directorate contains all cases of COVID-19 pandemic in Iraqi provinces including Kurdistan region. At this research, the COVID-19 data were collected for two years from the beginning of first infection in Iraq in February 2020 to February 2022. In Baghdad provenience, the numbers of COVID-19 cases was divided into three regions including Al- Rasafa, Al-Karkh, and the Medical city. The data include the number of the SARS-CoV-2 infection, recovered and death in all over Iraqi regions.

2.2 Data analysis

The data were analyzed using SPSS v29 software.

3. RESULTS AND DISCUSSION:

3.1 Account the total number of SARS-CoV-2 infection in Iraqi provinces

SARS CoV-2 spread to all Iraqi provinces according to announcement of Iraqi Ministry of Health. The section of Public Health Directorate at Iraqi Ministry of Health started to test suspected patients since February 2020, as there are many cases were confirmed in patients with travel aboard history. Then, the total COVID-19 cases has risen to reach many thousands of infection including thousands of recovered and many hundreds of death (Table 3.1). Later, many infected people are quarantined in the hospitals, and in some cases, the patients prefer to quarantine themselves in homes because of the lack spaces in the hospitals. The data shows that the number COVID-19 infection at the second year was less than at first year of COVID-19 pandemic; this is because of vaccination and increase the health awareness about virus transmission.

Table 3.1: The number of SARS-2 infection in Iraqi provinces from February 2020 to February 2022.

Provence	Infected	Percentage
Anbar	30906	1.614594353
Babylon	95369	4.274459289
Baghdad	906804	10.3275674
Basrah	296007	9.419627813
Dahuk	181651	13.0077767
Diyala	110551	6.249632544
Erbil	178368	8.900763138
Kerbala	126206	9.584659199
Kirkuk	124964	7.238377464
Missan	107260	8.922161915
Muthanna	50121	5.6963838
Najaf	138557	8.714490481
Ninewa	106066	2.631906752
Qadissiya	98687	7.074920155
Salah Al-Din	68370	3.966821889
Sulaymani	184494	7.897213884
Thi-Qar	127575	5.635697389
Wassit	170692	11.45867668
Total	3102648	7.532406984

3.2 Number of the COVID-19 recovered

Since COVID-19 pandemic, many patients were recovered from SARS-nCoV-2 infection depending on them immune systems. As there is no affected treatment for SARS-2, some medications that were prescribed to reduce the side effects of virus infection. Some minerals and vitamins were also given to improve the immune response to strict the virus infection. In some case, respiratory bacterial infection is associated with COVID-19, so antibacterial medications were given to the patients. In Iraq, the numbers of the recovered were dramatically increased due to increasing the health awareness about SARS-2 including isolations of the patients from uninfected persons.

Table 3.2: The number of SARS-2 recovery in Iraqi provinces from February 2020 to February 2022.

Provence	Recovered	Percentage
Anbar	21784	1.138042
Babylon	64315	2.882612
Baghdad	627675	7.148574
Basrah	220003	7.001005
Dahuk	135735	9.719795
Diyala	79598	4.499808
Erbil	130314	6.502815
Kerbala	87329	6.632163
Kirkuk	86007	4.981844
Missan	80181	6.669661
Muthanna	33688	3.82873
Najaf	90617	5.699322
Ninewa	76240	1.891809
Qadissiya	68911	4.940264
Salah Al-Din	48071	2.789076
Sulaymani	141952	6.076216
Thi-Qar	89502	3.953801
Wassit	117027	7.856107
Total	2198949	

3.3 Number of the COVID-19 hospitalized

In Iraq, the government health system has struggled to accommodate the large number of patients caused by COVID-19 pandemic. At the time of the pandemic, the Iraqi hospitals and quarantines are suffering from lacking of numbers of beds, modern medical equipments and adequate a numbers of skilled health workers. Besides, there is no effective and specific treatment for SARS-2 available in Iraq and worldwide, despite some drugs which were used for other infection such as Chloroquine phosphate that used for malaria treatment. Also, many patients have preferred to stay at homes instead of hospital, but in this situation, the life of the patient under the risk because of missing urgent emergency care that could they need in critical situation that could happen. In this research, the data show in Table 3.3 that the number of hospitalized patient infected with SARS-2 in all over the country. The data revealed that number of the hospitalized is high in winter, where the number of the hospitalized is low in summer.

Table 3.3: Total number of the hospitalized patients during the two years of the COVID-19 pandemic in Iraq.

Provence	hospitalized	Percentage
Anbar	9030	0.471746166
Babylon	30048	3.119861437
Baghdad	273937	3.119861437
Basrah	74494	2.370571487
Dahuk	44131	3.16015983
Diyala	30379	1.717375574
Erbil	45944	2.2926571
Kerbala	37943	2.881564458
Kirkuk	37494	2.171791273
Missan	26195	2.178967288
Muthanna	16101	1.829921102
Najaf	47237	2.970953376
Ninewa	28854	0.715979083
Qadissiya	28987	2.078092459
Salah Al-Din	19803	1.148968464
Sulaymani	39188	1.67743134
Thi-Qar	36529	1.613689123
Wassit	52908	3.551752078
Total	879202	2.134469423

3.4 Number of the COVID-19 death

SARS-nCoV-2 infected all ages, children, young and elderly. Many of fetal cases were reported of patients that suffering from chronic diseases, such as Asthma, respiratory and Cardiac impairments [10,11]. As shows, the numbers of death are spread around the Iraqi cities where the infections are confirmed. The results reveal that the SARS-2 infections don't depend on the geographic area, quality of the standard living and health system. This is due to the mechanism of the SARS-2 infection has not been fully understood. The results express that number of the death are varying from province to other. Thousands of passengers in Middle and South Iraq were in aboard and they potentially acquired the infection from there, and then transmitted the virus to Iraq. It was found that the number of the infection and death were high in the provenances that are near to Iran border including Basrah, Misan, Wassit and Sulaymaniyah. This is because of weak control, lacking quarantine and missing diagnostic tests of COVID-19 at the ports in Iraqi borders.

Table 3.3: The number of SARS-2 death in Iraqi provinces from February 2020 to February 2022.

Provence	Death	Percentage
Anbar	92	0.00480627
Babylon	1006	0.04508914
Baghdad	5192	0.05913155
Basrah	1510	0.04805169
Dahuk	1785	0.12782138
Diyala	574	0.03244918
Erbil	2110	0.10529137
Kerbala	934	0.07093222
Kirkuk	1463	0.08474238
Missan	884	0.07353339
Muthanna	332	0.03773268
Najaf	703	0.04421492
Ninewa	972	0.02411907
Qadissiya	789	0.0565638
Salah Al-Din	496	0.02877788
Sulaymani	3354	0.14356703
Thi-Qar	1544	0.06820707
Wassit	757	0.05081795
Total	24497	0.05947222

4. CONCLUSION

This study set out that SARS-2 spreads all over Iraqi cities, and infected thousands of persons. SARS-2 is highly contagious virus, so thousands of persons were infected with COVID-19. This study has identified that SARS-2 infection was varying between the provinces and seasons. This is due to poor health awareness and some Iraqi provinces are classified as tourist cities. Therefore thousands of patients were dead by this virus. This study has calculated the number of patients, hospitalized death and recovered (Figure 4.1).

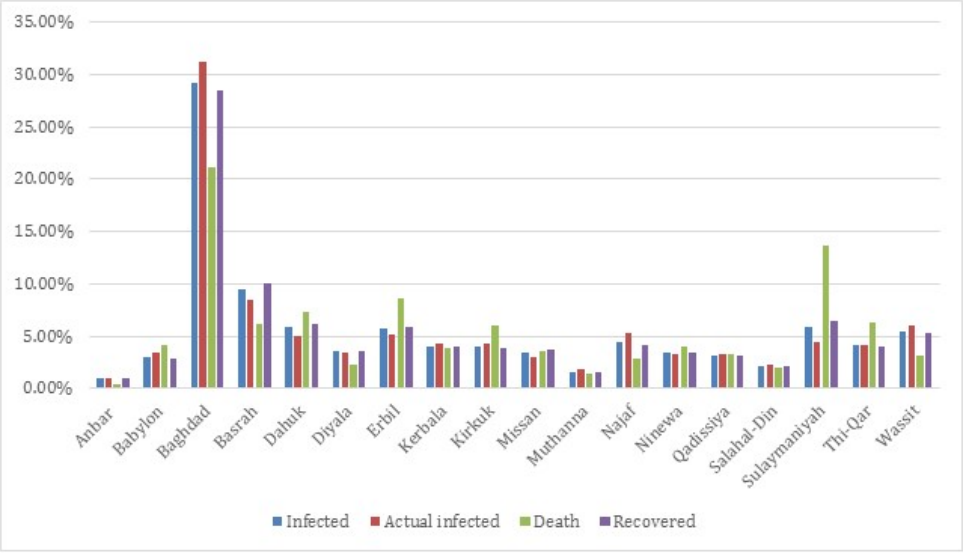

Figure 4.1: Number of SARS-2 cases in Iraq from 2020-20202.

This study has raised important questions about the natural of SARS-2 transmission and fatality rate caused by this virus, as the patients were recovered while other were dead due to SARS-2 infection. The strength of this study is its long duration and it will serve as a base for future studies about COVID-19 infection in Iraqi provinces. What is now needed is across-national study about COVID-19 infection to date, therefore, that could be significant for determining the SARS-19 distribution over the country.

CONFLICT OF INTEREST

The Author confirms that there is no conflict of interest regarding to this research.

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