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Epidemiology of COVID-19 Infection in Iraq

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Abstract

The first patient with COVID-19 was reported in Iraq on 24 February 2020 for the Iranian student came from Iran. As of 12 May 2021, the confirmed cases of COVID-19 infections reached 1127580, with 15855 deaths and 1023584 patients were recovered from the infection. Significant public health strategies have been implemented by the authorities to contain the outbreak nationwide. Nevertheless however, the number of cases is still rising dramatically. Here, we aim to describe a comprehensive and epidemiological study of all cases diagnosed in Iraq by 12 May 2021. Most of the cases were recorded in Baghdad followed by Basra. About 43% of the patients were female (with 38% deaths of the total cases) and 57% were male (with 62% deaths of the total cases). Most cases are between the ages of (20-59) years old, and (30-39) years are the most affected age group (13%) in 2020 , while those (40-49) years are the most affected age group (11%) in 2021. Healthcare workers represented about (2.78%) of the total confirmed cases. These findings enable us to understand COVID-19 epidemiology and prevalence in Iraq that can alert the our community to the risk of this novel coronavirus and serve as a baseline for future studies.

Introduction

At the end of 2019, a series of pneumonia cases of unknown cause emerged in Wuhan (Hubei, China) . A few weeks later, in January 2020, deep sequencing analysis from lower respiratory tract samples identified a novel virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as causative agent for that observed pneumonia cluster . On February 11th, 2020, the World Health Organization (WHO) Director-General, Dr. Tedros Adhanom Ghebreyesus, named the disease caused by the SARS-CoV-2 as “COVID-19”, and by March 11th, 2020 when the number of countries involved was 114, with more than 118,000 cases and over 4000 deaths, the WHO declared the pandemic status . Corona Virus Disease 2019 (COVID-19) is an RNA virus, with a typical crown-like appearance under an electron microscope due to the presence of glycoprotein spikes on its envelope . It is not the first time that a coronavirus causing an epidemic has been a significant global health threat: in November 2019, an outbreak of coronaviruses (CoVs) with severe acute respiratory syndrome (SARS)-CoV started in the Chinese province of Guangdong and again, in September 2012 the Middle East respiratory syndrome (MERS)-Co V appeared . There are four genera of CoVs: (I) α -coronavirus (alphaCoV), (II) β -coronavirus (betaCoV) probably present in bats and rodents, while (III) δ -coronavirus (deltaCoV), and (IV) γ -coronavirus (gammaCoV) probably represent avian species .

The COVID-19 epidemic expanded in early December from Wuhan, China’s 7th most populous city, throughout China and was then exported to a growing number of countries. The first confirmed case of COVID-19 outside China was diagnosed on 13th January 2020 in Bangkok (Thailand) On the 2nd of March 2020, 67 territories outside mainland China had reported 8565 confirmed cases

of COVID-19 with 132 deaths, as well as significant community transmission occurring in several countries worldwide, including Iran and Italy and it was declared a global pandemic by the WHO on the 11th of March 2020 . The number of confirmed cases is constantly increasing worldwide and after Asian and European regions, a steep increase in cases is currently (31 March 2020) being observed in low-income countries .

In Iraq, the first confirmed case of COVID-19 has been reported in Najaf province for the Iranian student came from Iran on 24 February 2020, followed by 4 cases from one family in Kirkuk province on 25 February, they have also a travel history to Iran. An additional case was recorded on 27 February in Baghdad, for a patient who recently visited Iran. 74 confirmed cases and 8 fatalities have been reported across Iraq as of 12 March 2020 . The confirmed cases jumped to 1415 on 16 April 2020, with 78 fatalities were recorded . By 24 May 2020, the confirmed cases of COVID-19 reached 4469 and reported 160 deaths, while 2738 patients recovered from the infection . The number of COVID-19 cases reported in Iraq continues to increase during the second community wave's acceleration phase, starting in 2021.

Because the first cases of the COVID-19 disease were linked to direct exposure to the Huanan Seafood Wholesale Market of Wuhan, the animal-to-human transmission was presumed as the main mechanism. Nevertheless, subsequent cases were not associated with this exposure mechanism. Therefore, it was concluded that the virus could also be transmitted from human-to-human, and symptomatic people are the most frequent source of COVID-19 spread. The possibility of transmission before symptoms develop seems to be infrequent, although it cannot be excluded. The virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so

it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow). The best way to prevent and slow down transmission is 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.

The incubation period for COVID-19 is thought to be within 14 days following exposure, with most cases occurring approximately four to five days after exposure.

The spectrum of symptomatic infection ranges from mild to critical, most infections are not severe, Specifically, in a report from the Chinese Center for Disease Control and Prevention that included approximately 44,500 confirmed infections with an estimation of disease severity:

- ✚ Mild (no or mild pneumonia) was reported in 81 percent.
- ✚ Severe disease (e.g., with dyspnea, hypoxia, or >50 percent lung involvement on imaging within 24 to 48 hours) was reported in 14 percent.
- ✚ Critical disease (e.g., with respiratory failure, shock, or multiorgan dysfunction) was reported in 5 percent.
- ✚ The overall case fatality rate was 2.3 percent; no deaths were reported among noncritical cases.

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.

Aim of the study

This study is an attempt to demonstrate the statistical and geographical COVID-19 prevalence and epidemiology in Iraq governorates.

The results of the research

1. First wave vs second wave of COVID-19 pandemic

There is a significant increase in the number of COVID-19 cases in the second wave of COVID-19 in Iraq (the 2nd wave started in the 5th week of 2021) compared with the number of cases in the 2020 , which mean that the 2nd wave is more severe than the 1st wave of COVID-19.

2.Iraq's governorates & COVID-19 Infection

The most affected governorates are Baghdad (Karkh and Resafa) and Basra. While the Anbar and Muthanna are the lowest affected governorates in the number of confirmed cases since the beginning of the COVID -19 pandemic.

3.Age group and COVID-19 infection rate

It turns out that the virus infects older people, the older a person is, the higher the chance of infection with the virus and higher the death rate .

4.Geneder and COVID-19 pandemic

Men have higher confirmed cases of COVID-19 and higher fatality rates compared to the woman.

5.Health care workers and COVID-19 pandemic

Risk of developing COVID-19 is higher between this group.

Discussion

1. First wave vs second wave of COVID-19 pandemic

Figure 1 show the Cumulative distribution of COVID-19 cases by health status in Iraq since 24 February 2020 until 2 May 2021 , where the total confirmed cases are **1,074,940** with **15,536** associated deaths , while the total cured cases are **957,200 (89%)** and the total active cases are **102,194**. We note there is a significant increase in the number of COVID-19 cases in the second wave of COVID-19 in Iraq , starting in 2021 compared with the number of cases in the 2020. This indicate to the rapid spread rate of COVID-19 between the Iraq's population in 2021. This is attributed to increase in testing capacity nationwide; active contacts tracing and to easing of curfew in many parts of the country especially in the overcrowded and poor areas and no adherence to the proper infection prevention measures and practices.

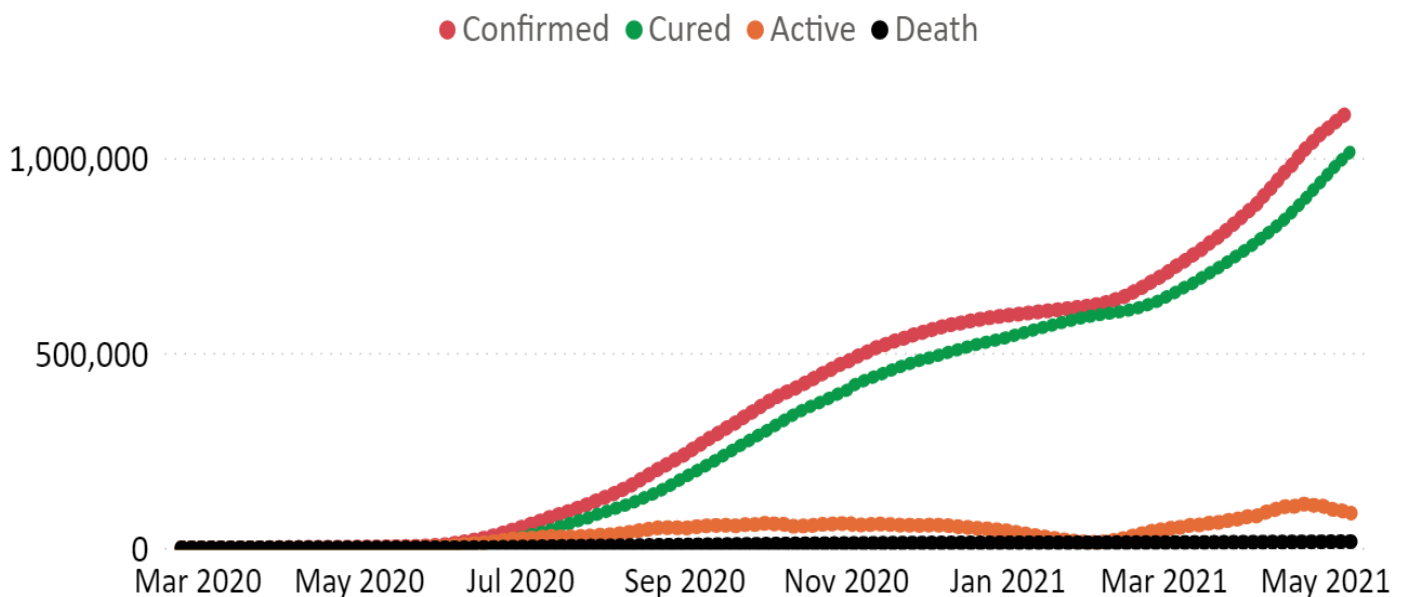


Figure 1 : Cumulative distribution of COVID-19 cases by health status.

The 2nd wave of COVID-19 in Iraq started in the 5th week of 2021 and seems to have peaked in W16 when a total of 54147 confirmed cases were reported with a positivity rate of 17 %. The reported cases have declined in W17 to stand at 43608 with a positivity rate of 15% (**Figure 2**), noticeably less than that reported in W16 by 10539 cases indicating a potential decline in the wave that could be confirmed if containment measures and prevention tools are adhered to.

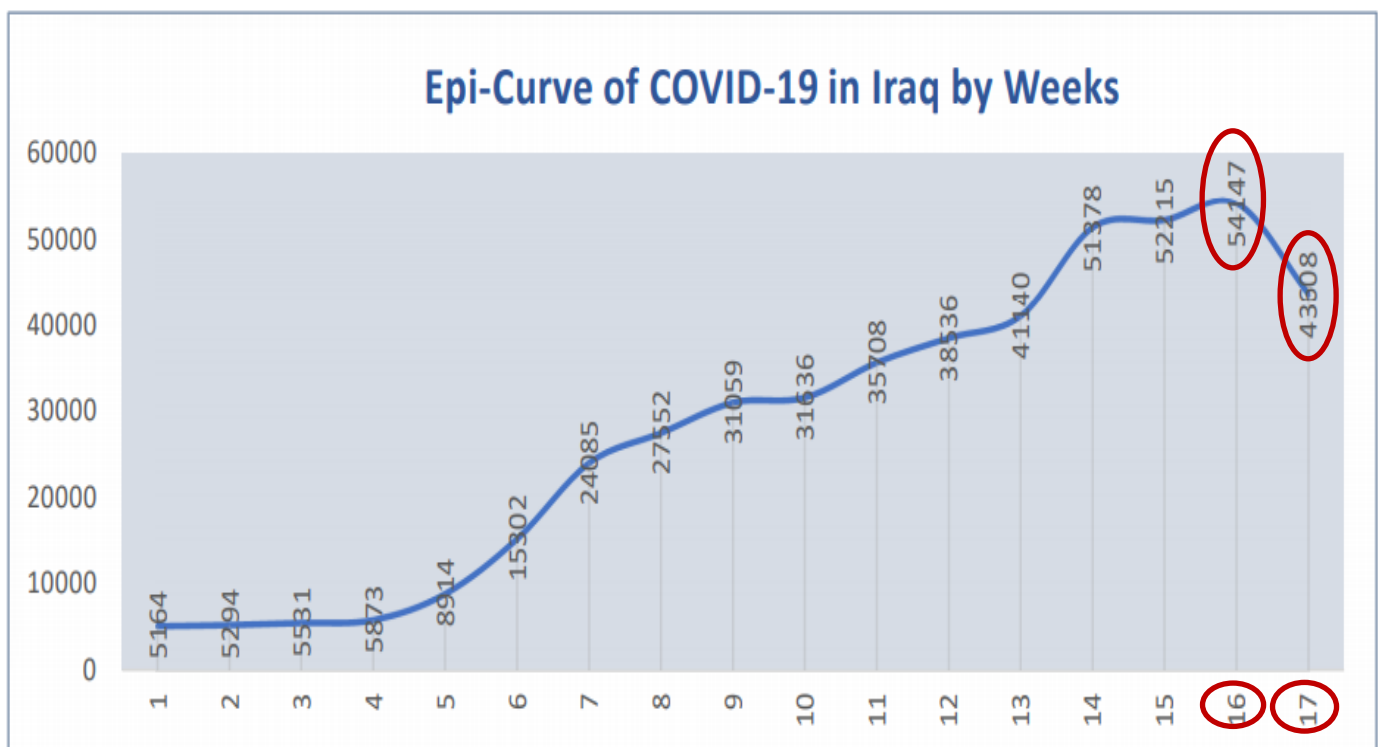


Figure 2 : Epi-Curve of COVID-19 in Iraq by weeks , 2021

2.Iraq's governorates & COVID-19 Infection

Table 1 provides summary statistics of COVID-19 in Iraq by province. The provinces varied widely in the number of cases, incidence rate and case fatality . The highest number of cases were recorded in Baghdad (Karkh and Resafa) and Basra compared to other cities due to the fact that these provinces have a large population with many factories and shopping malls that could not follow the instructions of the health authorities to contain the spread of the virus. While the Anbar and Muthanna are the lowest affected governorates in the number of confirmed cases since the beginning of the COVID -19 pandemic. Although the Sulaymaniyah has a lower number of confirmed cases of COVID-19 compared with Baghdad and Basra governorates , this governorate was reported high number of death cases (2033).

COVID-19 Cumulative Status				
DOH	# Confirmed	# Cured	# Deaths	# Active
→ ANBAR	10,721	9,555	76	1,090
BABYLON	37,604	35,460	721	1,423
→ BAGHDAD-KARKH	189,736	173,096	1,265	15,375
→ BAGHDAD-RESAFA	179,443	166,596	2,375	10,472
→ Basrah	106,954	94,396	1,037	11,521
DAHUK	55,852	50,495	963	4,394
DIWANIYA	35,309	33,454	540	1,315
DIYALA	45,743	42,997	329	2,417
ERBIL	50,366	43,587	1,131	5,648
KERBALA	44,123	42,532	684	907
KIRKUK	43,500	40,798	919	1,783
MISSAN	39,570	36,409	579	2,582
MUTHANNA	20,026	14,751	286	4,989
NAJAF	55,642	49,410	495	5,737
→ NINEWA	30,585	28,916	531	1,138
SALAH AL-DIN	24,082	20,118	322	3,642
SULAYMANIYAH	51,928	45,056	2,033	4,839
THI-QAR	40,835	39,018	992	825
WASSIT	60,895	51,523	556	8,816

Table1 : COVID-19 cases by province in Iraq, 24 February –12 May 2021

3.Age group and COVID-19 infection rate

Most cases of COVID-19 in Iraq are between 20-59 years of age whether in the first wave or in the second wave of COVID-19. However, those (30-39) years are the most affected age group (13%) in 2020, while those (40-49) years are the most affected age group (11%) in 2021 (until 12 May). Such age groups are the ones that are most likely to have a high chance of participation in different sectors of work. We also need to consider the population distribution. **(Figure 3)**

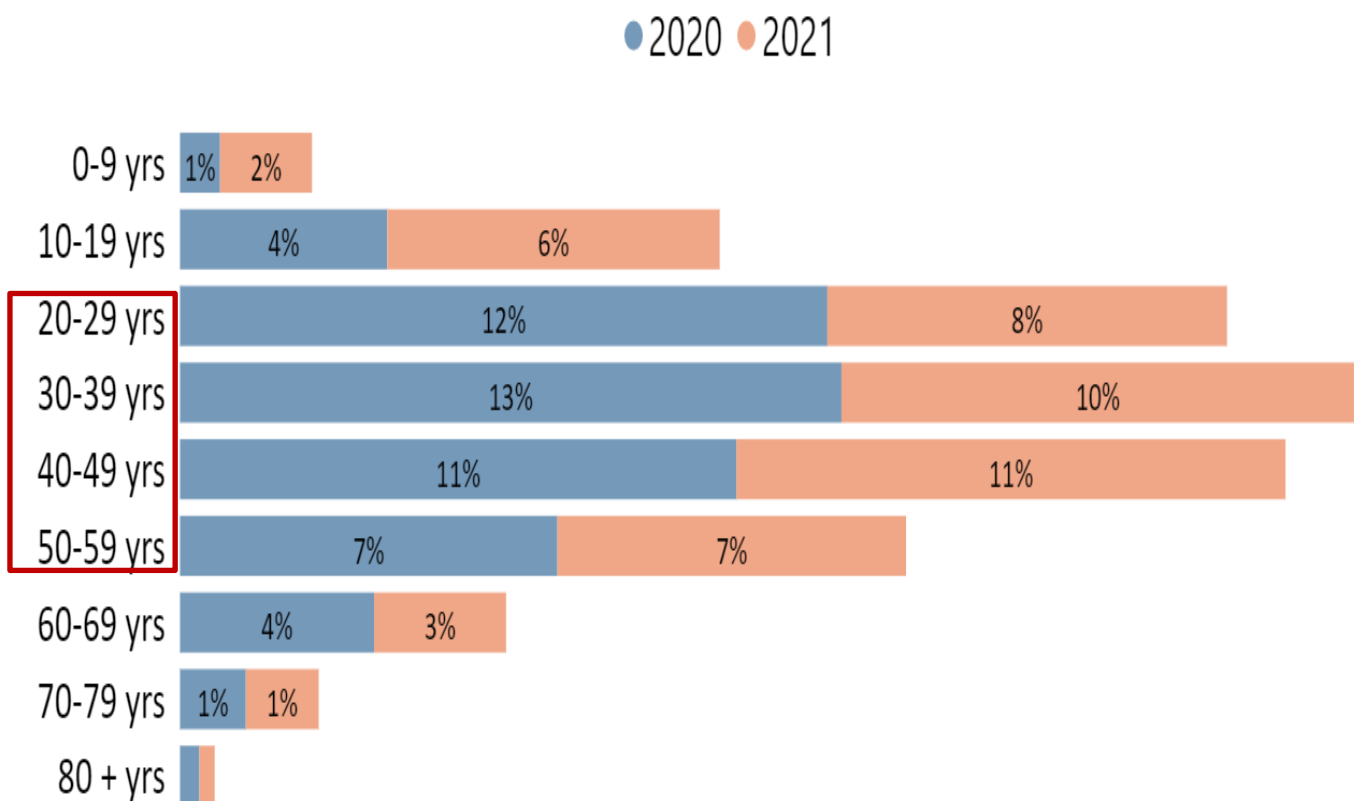


Figure 3: Distribution of confirmed cases of COVID-19 by the age group

As can be seen from the **Figure 4** , there is a clear trend of increasing in the fatality rate with ages between 40-69 years old reaching the max in patients with ages between 60-69 years old (20.24%).

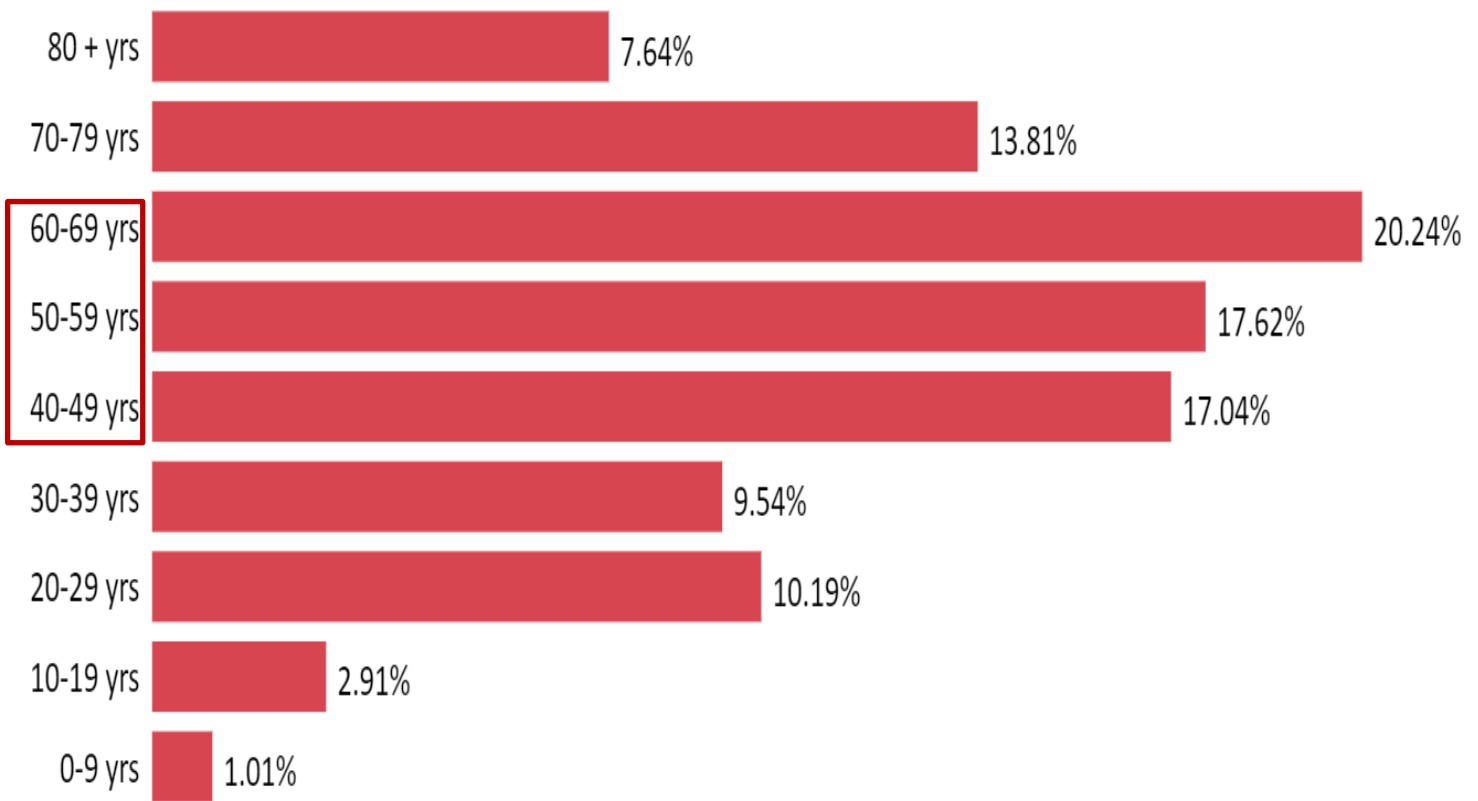


Figure 4: Distribution of death cases of by the age group , 24 February –12 May 2021

Coronavirus, can lead to hospitalization and even death for young and middle aged adults, it has caused the most severe health issues for adults over the age of 50 years. This is due in no small part to the number of underlying health conditions present in older populations. Conditions like diabetes, heart disease, and other chronic illnesses can lead to more intense symptoms and complications in the disease. Additionally, as people age, their immune system gradually loses

its resiliency, meaning that they are more susceptible to infection of any kind, especially a new one like covid-19.

Although children, especially those without underlying conditions, seem to be less affected by COVID-19 than other groups, they are still likely to be carriers of the disease. Pre-existing illnesses that put patients at higher risk of dying from a COVID-19 infection are:

cardiovascular disease, diabetes, chronic respiratory disease, hypertension, cancer. Usually these co-morbidities exist in older age people rather than younger one and this also considered as factor why old aged patient with COVID-19 show a higher rate of fatality. See **Figure 5 and Figure 6.**

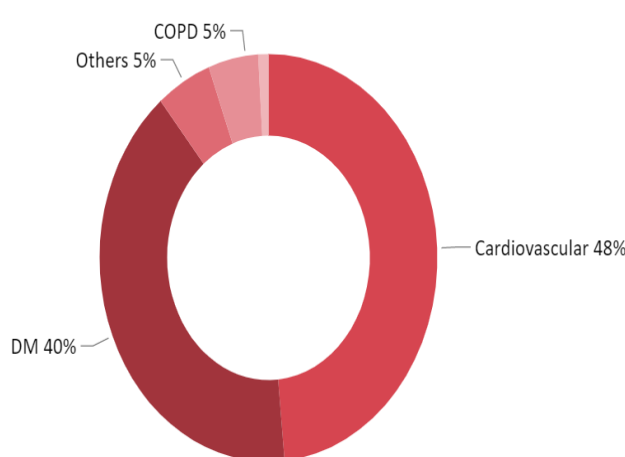


Figure 5: Percentage of comorbidities among death cases in 2020.

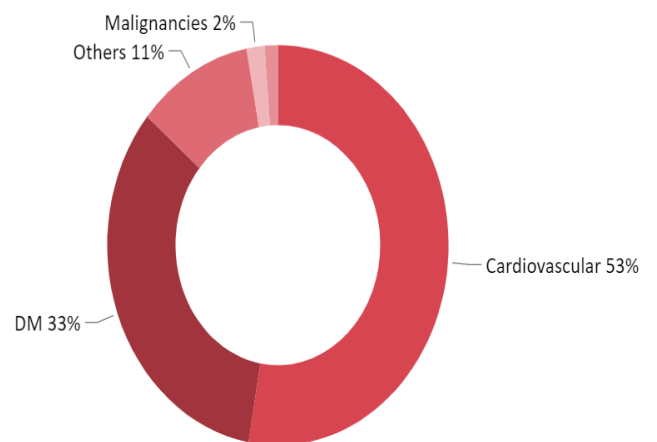


Figure 6 : Percentage of comorbidities among death cases in 2021(until 12 May)

4. Gender and COVID-19 pandemic

Figure 7 shows that more than half (57%) of the confirmed COVID-19 cases in Iraq were males and 43% for females (till 12 May 2021). This may be related to the fact that men are more likely to be out of the home and as such at a higher risk of exposure.

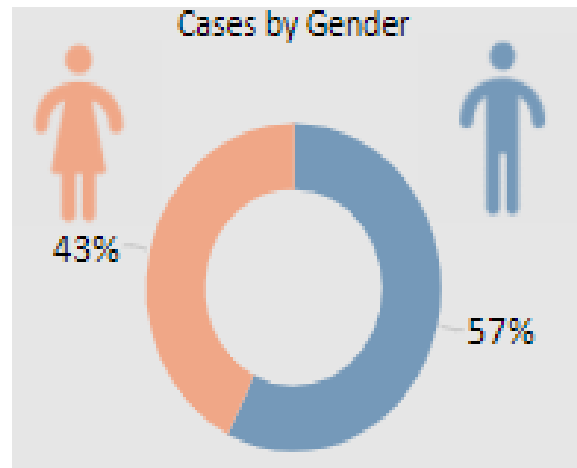


Figure 7 : COVID-19 cases distribution by gender, till 12 May 2021

Of all the COVID-19 fatalities, men represented 62%. This is consistent with more male cases as well as comorbidities more in male (**Figure 8**).

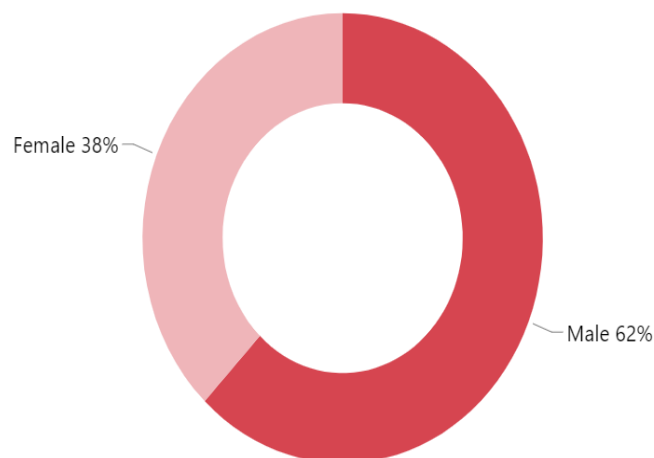


Figure 8 : Percentage of death cases by gender , till 12 May 2021.

In IRAQ more than half (57%) of the confirmed COVID-19 cases were males and also percent of fatalities is higher in male rather than female , till 12 May 2021, this may be related to the fact that men are more likely to be out of the home and as such at a higher risk of exposure.

One major variable in severity of COVID-19 is age. But this can't explain the sex bias seen globally because the increased male fatality rate is the same in each age group from 30 to 90. Women also live on average six years longer than men, so there are more elderly women than men in the vulnerable population.

The other major factor is the presence of chronic diseases, particularly heart disease, diabetes and cancer. These are all more common in men than women, which might account for some of the bias. Male hormones also influence behavior. Testosterone levels have been credited with major differences between men and women in risky behaviours such as smoking and drinking too much alcohol, as well as reluctance to heed health advice and to seek medical help. The extreme differences in smoking rate between men and women in Iraq may help to account for their very high ratio of male deaths.

5. Health care workers and COVID-19 pandemic

By 12 May 2021, a total of 31356 healthcare workers had been infected with COVID-19. Represented about (2.78%) of the total confirmed cases in Iraq. The most of these infections were located in Baghdad, Karbala, Najaf and Babylon (Figure 9).

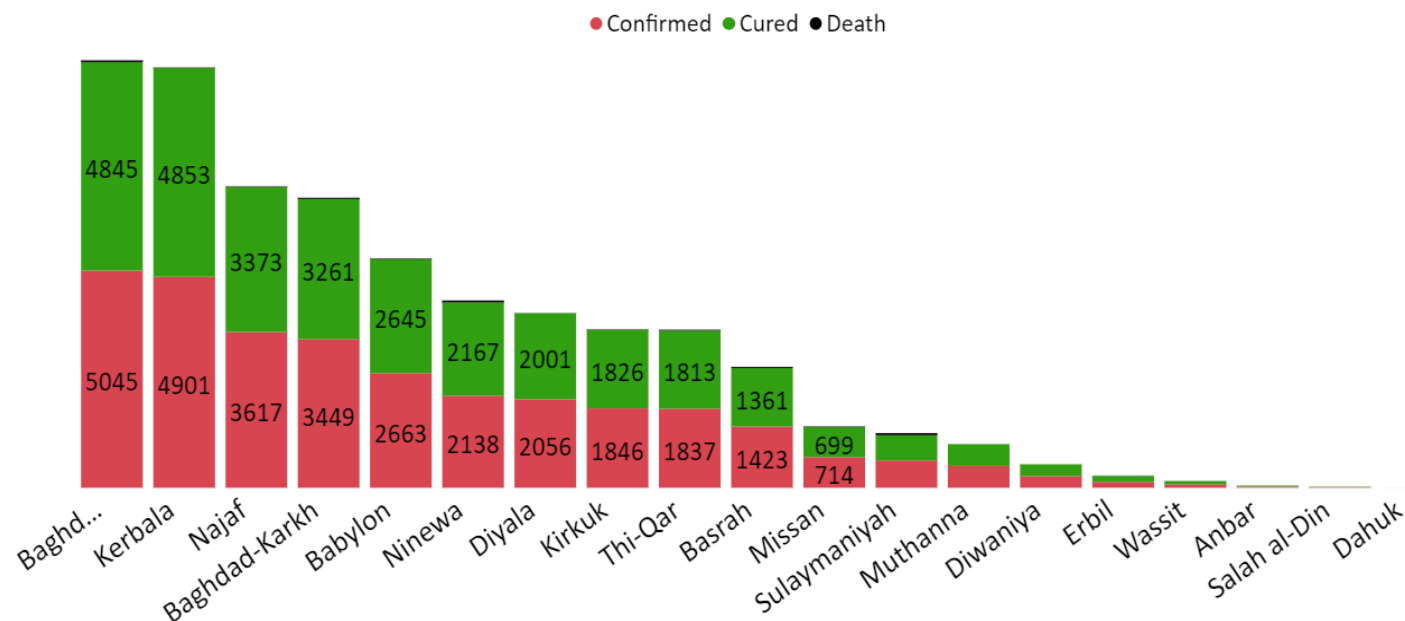


Figure 9 : Healthcare workers Status by province, till 12 May 2021.

The majority of the infected health workers were nursing staff (52%), followed by administrative and support staff (31%) (Figure 10). These two groups have a greater chance of being in contact with infected patients.

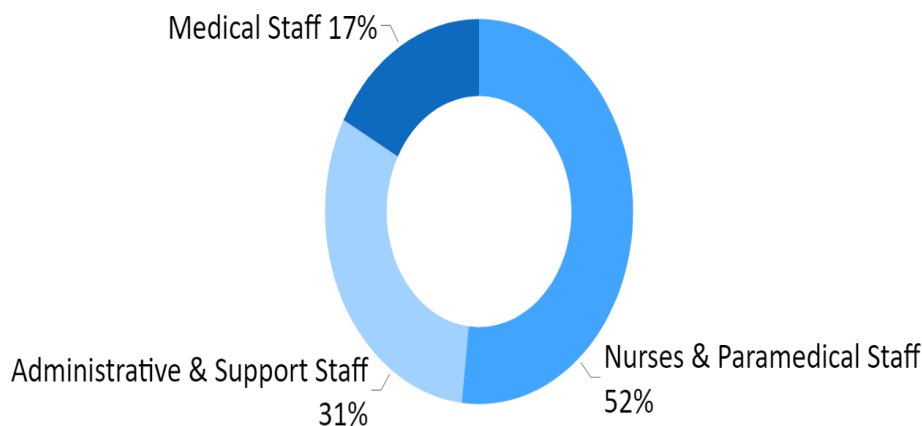


Figure 10 : Healthcare workers Status by occupation type, till 12 May 2021.

Health workers are at the front line of the COVID-19 outbreak and as such are exposed to hazards that put them at risk of infection. Hazards include pathogen exposure, long working hours, psychological distress, fatigue, occupational burnout, stigma, and physical and psychological violence.

Diagnostic tests for detect COVID-19 virus

Clinical suspicion — The possibility of COVID-19 should be considered primarily in patients with new-onset fever and/or respiratory tract symptoms (fever, cough, dyspnea). It should also be considered in patients with severe lower respiratory tract illness without any clear cause. Other consistent symptoms include myalgia, diarrhea, and smell or taste disturbances, although these syndromes can occur with other viral respiratory illnesses.

1- **RT-PCR Test** : is a real-time reverse transcription polymerase chain reaction (rRT-PCR) test for the qualitative detection of nucleic acid from SARS-CoV-2 in upper and lower respiratory specimens (nasopharyngeal or oropharyngeal swabs, sputum, lower respiratory tract aspirates, bronchoalveolar lavage, and nasopharyngeal wash/aspirate). The nose swab PCR test for COVID-19 is the most accurate and reliable test for diagnosing COVID-19. A positive test means you likely have COVID-19. A negative test means you probably did not have COVID-19 at the time of the test.

* **Serology to identify prior/late infection** — Serologic tests detect antibodies to SARS-CoV-2 in the blood, and those that have been adequately validated can help identify patients who have previously had COVID-19. Serologic tests may also be able to identify some patients with current infection (particularly those who present later in the course of illness, IgA-based antibody tests are not recommended

2- **Rapid diagnostic test (RDT)** : The antigen detection rapid diagnostic test (Ag-RDT) directly detects viral proteins or antigen of SARS-CoV-2, the virus that causes COVID-19, in respiratory samples using a method of lateral flow immunoassay. While this test is less sensitive than the rRT-PCR, it is easy to use and offers faster turnaround time, allowing tests results to become available in less than 30 minutes. It can also be performed directly at point-of-care, therefore no biosafety level 2 (BSL2) laboratory facility is required. RDT Detect antibody IgG And IgM with the control part that indicates the validity of the device, after application of the sample ,presence of red line indicates the validity of the device, if the device detected only IgM→ acute infection (less than 15 days), if detected only IgG→ infection had present for longer than 15 days, If detected both→ acute and present infection for longer than 15 days.

3- **Chest X-ray** can be used as an effective, fast and way to immediately triage COVID-19 Patient when suspected, real time PCR is preferred over other methods since its highly sensitive test, reliable, cancan detect even a very small amount of viral RNA in the specimen

Conclusion

The present study of Iraqi Prevalence of COVID-19 suggest that the pandemic of COVID-19 in Iraq is severe until today (12 May 2021). Large variation did exist among Iraqi provinces in the risk of infection and fatality. Provinces with air travel facilities seemed at higher risk of COVID-19 Virus infection. Pandemic control measures are going not well. Also the population adherence to public health measures and COVID-19 vaccine demand and uptake are not to the required level. It is highly recommended that the active cases detection is upgraded to facilitate and accelerate the complete control of the pandemic in Basra and the rest of Iraq.

Recommendations

- Intensify community sensitizations and engagement to encourage population adherence to public health measures and COVID-19 vaccine demand and uptake.
- Continue to strengthen risk communications and community mobilization and media engagement activities to encourage people to continue wearing masks and adhere to the COVID-19 guidelines.
- Creating hotlines for patients undergoing home isolation, in addition to informing on vaccination sites and available vaccine types as possible.
- More testing, contact tracing, and active surveillance remain essential to detect hidden cases and newly emerging strains. It is also an opportunity for the health authorities and line supporting partners to reassess the immunity profile, pandemic resources structure, and attempt to fill the gaps.
- Ensure proper preparedness to respond to the probable 3rd wave of the pandemic, expected in July this year.
- Coordinate a joint study with the academic institutions to determine the immunity profile of the population and assist in highlighting the efficacy of the vaccine, the cold chain, and vaccinators performance.

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