

# Iraq experience in handling the COVID-19 pandemic: implications of public health challenges and lessons learned for future epidemic preparedness planning

Faris Lami<sup>1</sup>, Hiba Abdulrahman Rashak<sup>2</sup>, Hanan Abdulghafoor Khaleel<sup>3</sup>,  
Sinan Ghazi Mahdi<sup>4</sup>, Firas Adnan<sup>5</sup>, Yousef S. Khader<sup>6</sup>, Riyadh A. Alhilfi<sup>7</sup>, Asaad Lehlewa<sup>7</sup>

<sup>1</sup>Department of Community and Family Medicine, College of Medicine, University of Baghdad, Baghdad 10047, Iraq

<sup>2</sup>Surveillance Section, Communicable Diseases Control Center, Directorate of Public Health, Ministry of Health, Baghdad 10047, Iraq

<sup>3</sup>Head of the Surveillance Section, Communicable Diseases Control Center, Directorate of Public Health, Ministry of Health, Baghdad 10047, Iraq

<sup>4</sup>Head of Communicable Diseases Control Center, Directorate of Public Health, Ministry of Health, Baghdad 10047, Iraq

<sup>5</sup>Al-Karkh Health Directorate, Public Health Department, Ministry of Health, Baghdad 10047, Iraq

<sup>6</sup>Professor of Epidemiology, Medical Education and Biostatistics, Department of Community Medicine, Public Health and Family Medicine/Faculty of Medicine, Jordan University of Science & Technology, Irbid 22110, Jordan

<sup>7</sup>Directorate of Public Health, Ministry of Health, Baghdad 10047, Iraq

Address correspondence to Faris Lami, E-mail: farislami@gmail.com.

## ABSTRACT

**Background** Iraq has been exceptionally challenged by the COVID-19 pandemic due to the already exhausted healthcare system.

**Objectives** To describe the epidemiological situation of COVID-19 in Iraq, the government's response to the pandemic, and provide recommendations for further action.

**Methods** A desk review of secondary data using the available reports on the epidemiological situation in Iraq as well as official governmental sources was conducted.

**Results:** The major surge in the number of COVID-19 cases occurred in the first week of June and continued to increase dramatically until mid-October when a significant decrease happened. With a few exceptions, the reproductive number  $R$  has been consistently above 1. Patients aged 30–39 years (25.6%) were the most affected, while those aged 60–69 years (26.7%) had the highest deaths rates. Iraq tried to contain the pandemic through several regulations: border control, enforcing curfew, mask-wearing, and social distancing, COVID-19 isolation centers, expanding lab capacity, contact tracing, as well as several supportive economic measures. However, the extent of implementing these regulations is questionable.

**Conclusion** Additional administrative and scientific measures with special emphasis on handling mass gathering, coordination with media and better training of healthcare workers particularly on infection prevention and control.

**Keywords** COVID-19, healthcare delivery, Iraq, pandemic

## Introduction

The rapidly evolving COVID-19 pandemic, an emerging infectious disease caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has currently affected more than 210 countries, areas or territories worldwide.<sup>1</sup> In order to control the pandemic, the global community has enforced a lot of measures that has severely affected global socio-economic development.<sup>2</sup> The COVID-19 pandemic causes a loss of at least \$1–3.94 trillion to the world's economy during the year 2020.<sup>3,4</sup> COVID-19

pandemic has also brought a lot of hardships to the health systems throughout the globe, consumed a lot of health

Faris Lami, Prof

Hiba Abdulrahman Rashak, Dr.

Hanan Abdulghafoor Khaleel, Dr.

Sinan Ghazi Mahdi, Dr.

Firas Adnan, Dr.

Yousef S. Khader, Prof

Riyadh A. Alhilfi, Dr.

Asaad Lehlewa, Dr.

resources and challenged even the most advanced healthcare systems in the developed world.<sup>5</sup> For Iraq, a Mediterranean developing country, the challenge has been even bigger and multifaceted for several reasons.<sup>6</sup> First, the timing of the pandemic coincided with Iraq recently emerging from a 4 years' war with ISIS and facing political unrest. Second, the healthcare system in Iraq suffers from decades of infrastructural insufficiency due to wars, sanctions, and civil unrest. Third, the deeply rooted mistrust between the public and the healthcare system has been playing a key role in the widespread lack of commitment to recommended health measures by Iraqis.<sup>7</sup>

During the last 3 years, Iraq's institutions including the Communicable Diseases Control Center (Iraq CDC) had invested in disaster/crisis preparedness activities. In 2018, Iraq CDC in collaboration with Eastern Mediterranean Public Health Network (EMPHNET) had conducted a series of training workshops to train many healthcare workers (HCW) on rapid response to outbreaks. Nonetheless, the unprecedented COVID-19 pandemic left no time to evaluate the training. Instead, it provided a real-life evaluation of all the preparedness activities taken during the last years.

After about 9 months of the pandemic, it is necessary to identify the gaps, weaknesses, what went well and what went badly in Iraq's response to the pandemic. Considering the extreme scarcity of scientific publications in this regard, this paper aimed to describe the epidemiological picture of COVID-19 in Iraq, explore the specific challenges facing the Iraqi healthcare system, describe the country's response to the pandemic, identify shortcomings in the performance and provide recommendations for further measures to contain the pandemic. Also, to identify areas where most efforts need to be taken to strengthen the healthcare system to respond to future pandemics. We anticipate that this paper provides a comprehensive overview of the situation of the pandemic in Iraq within its political and economic context. In this article, we will highlight the epidemiological situation in Iraq, COVID-19 among HCW, the governmental response (including containment measures, case-detection and tracing, risk communication, economic measure, and the management of oxygen crisis) as well as achievements and challenges.

## The epidemiological situation in Iraq

Iraq reported its first COVID-19 case on 24 February 2020. The patient was an Iranian student who has been studying in the Najaf governorate and had entered the country before the implementation of banning Iranian nationals from entering Iraq. Only 2 days later, a family of four

from Kirkuk governorate was diagnosed with the disease; the family had just returned from Iran. On 3 March 2020, the Sulaymaniyah governorate reported the death of a 69-year-old COVID-19 patient.<sup>8</sup> This was the first death due to the disease, after which the number of cases and deaths started to escalate.

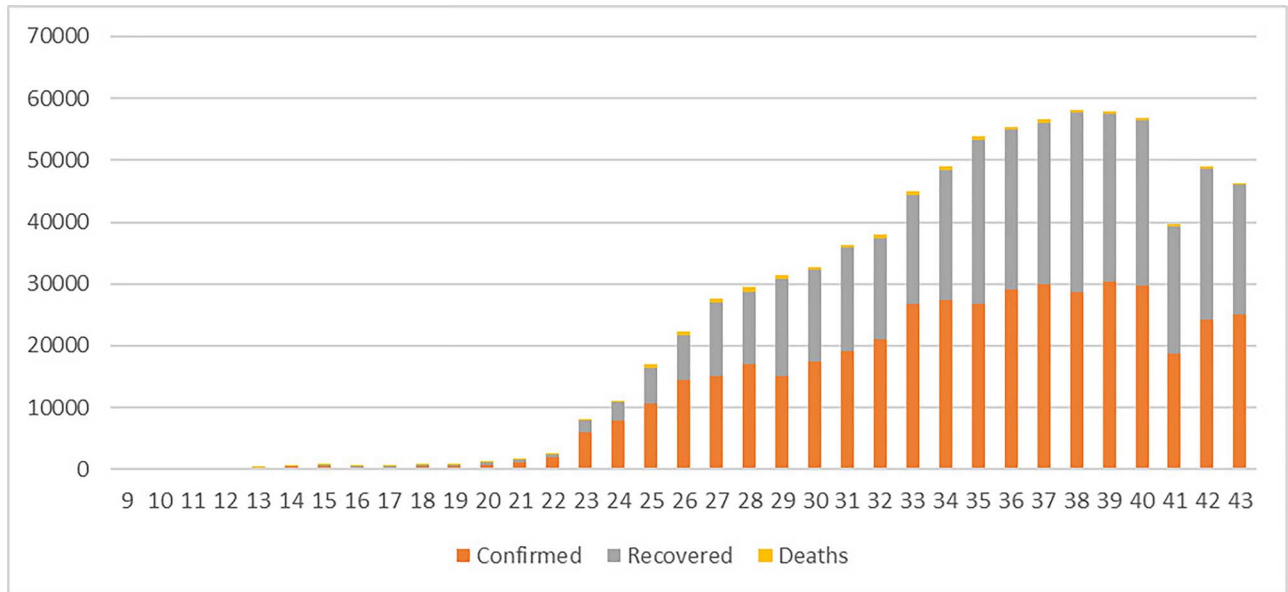
Iraq has been in the stage of wide community transmission since May 2020. As of 25 October 2020, a total of 451 707 confirmed cases, and 10 623 total deaths occurred in Iraq.<sup>9</sup> Worldwide, Iraq has the 17 highest total number of cases and the 19 highest number of total deaths.<sup>10</sup> Also, Iraq has the 2 highest number of cumulative cases and deaths in the Eastern Mediterranean Region, after Iran.<sup>10</sup> It also ranked 6 in terms of the number of cumulative cases per million population and second in terms of the number of cumulative deaths per 1 million population.<sup>10</sup>

From weeks 9 to 14, the cases were steadily increasing, almost doubling weekly. After a slight decrease in weeks 15 and 16, the number of cases started to rise again in week 17. However, the major surge in the number of cases occurred in week 23 (the first week of June). Since then, cases continued to increase dramatically until weeks 41 and 42 when a significant decrease happened. [Figure 1](#) shows the progression of the pandemic in Iraq since it was first recorded (during the 9 Epi week). [Figure 2](#) shows the decline in incidence per 100 000 population after the 1st of October relative to the previous two weeks.

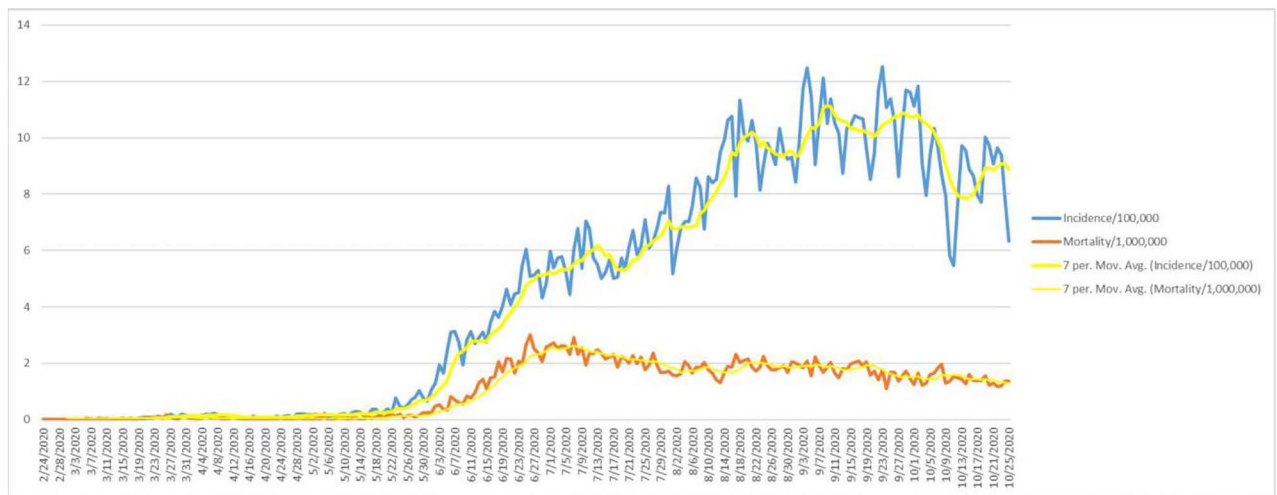
Generally, the changes in the number of deaths followed a somehow similar pattern. Aside from Iran, when we compare Iraq to other Mediterranean countries, even the ones with a high number of cases, Iraq reported a much higher number of deaths. By the end of March, for example, five Mediterranean countries reported a higher number of cases than Iraq. Nevertheless, Iraq had reported the highest number of deaths after Iran.<sup>11</sup> However, since mid-July, there has been a decline in mortality per 1 000 000 ([Fig. 2](#)). The case-fatality ratio for COVID-19 increased with increasing age ([Table 1](#)) starting with 0.4% in children aged 0–9 years old to 27.6% in patients in their nineties. A similar pattern has been reported from around the world.<sup>12</sup>

The positivity rate has been above 10% since week 24. It was even above 20% on some occasions, reaching its highest on week 39 (21.5%) ([Fig. 3](#)).

At the beginning of the outbreak in Iraq, the basic reproductive number was 4.71 (95% CI = 4.00–7.00). As of October 25, the reproductive number was 1.17 (95% CI = 1.12–1.23). The decrease in transmissibility, depletion of susceptibles and adherence to protective measures are all factors that can lead to a reduction in the reproductive number. A decreasing *R* indicates a slower progression of the outbreak.



**Fig. 1** Weekly number of COVID-19 cases, recovered cases and deaths from COVID-19.



**Fig. 2** Incidence per 100 000 and mortality per 1 000 000 of COVID-19 in Iraq.

With a few exceptions, the reproductive number  $R$  has been consistently above 1 most of the time (Fig. 4).

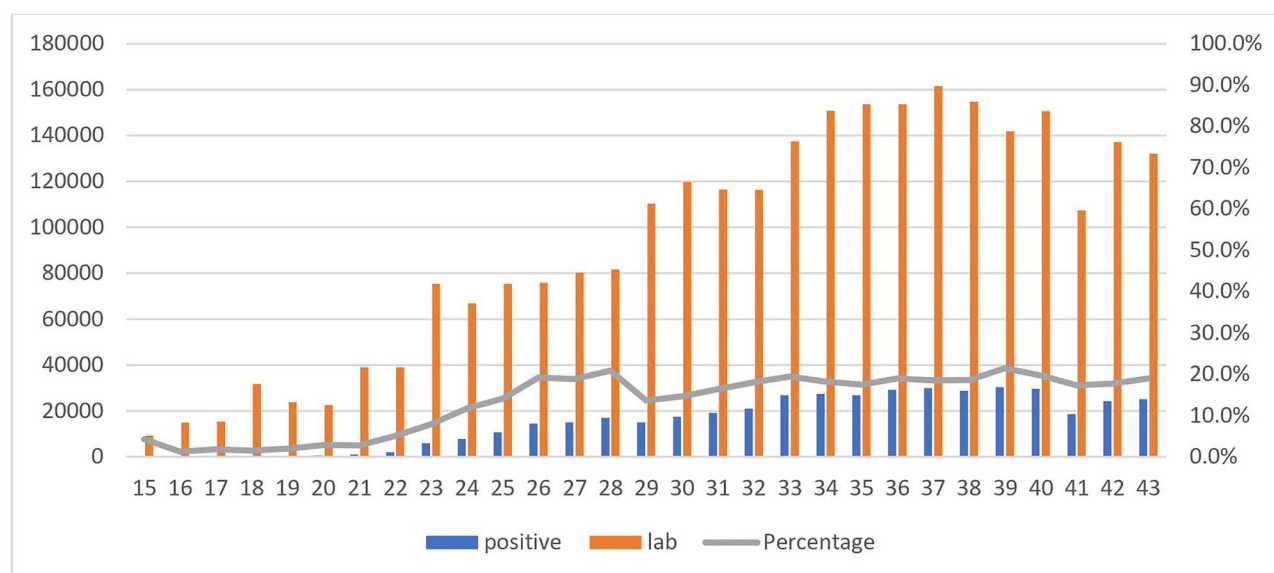
### The geographical distribution

As of 25 October 2020, the incidence rate at the national level was 1125.0 per 100 000 persons<sup>13</sup> with wide variation among governorates inside the country. The highest incidence was recorded in Wasit (1930.3 per 100 000), followed by Karbala (1634.8 per 100 000) and Baghdad (1616.7 per 100 000) governorates. Anbar (273.7 per 100 000) and Nineveh (343.9 per 100 000) governorates had the least incidences (Fig. 5). Mortality per 1 000 000 was highest in Sulaymaniyah (535.3

and Karbala (381.0), whereas the lowest was in Anbar (37.0) and Nineveh (83.0) governorates. (Fig. 5). Most of the deaths in the hospitals occurred during a period of <7 days. This indicates that most cases end with deaths started treatment at home and reach hospitals only after worsening the situation to an extent that little can be made by the hospitals.<sup>13</sup>

### Demographic distribution

Iraqi population is a young population with 60% are less than 25 and a median age of 20 years, yet the highest proportion of affected patients were in the age group 30–39 years (25.6%), 20–29 years (21.6%) and 40–49 years (20.2%). On the other



**Fig. 3** Positivity rate of COVID-19 in Iraq over time.

**Table 1** Case fatality ratio (CFR) for COVID-19 by age groups

Age group in years	CFR
0–9	0.4%
10–19	0.1%
20–29	0.3%
30–39	0.6%
40–49	1.6%
50–59	3.4%
60–69	9.2%
70–79	16.1%
80–89	21.9%
90+	27.6%

hand, patients aged 60–69 years (26.7%) contributed to the highest proportion of total COVID-19 deaths followed by those aged 50–59 years (22.1%) (Fig. 6). A total of 60% of the cases and 65% of the deaths were males. This gender difference has been frequently documented in the literature.<sup>14–16</sup>

### COVID-19 among healthcare workers

As of 25 October 2020, 23 023 (5.1%) of total cases and 153 (1.4%) of total deaths occurred among HCWs in Iraq.<sup>13</sup> About half of the cases (48%) among HCW were paramedics. The second highest (17%) were other professions, and doctors represented 14% of the cases, the third-highest. Table 2

details the distribution of cases among different health care professions.

## Governmental response

### Early response

On January 28, a month before the first COVID-19 case in Iraq, a ministerial committee headed by the Minister of Health was established to advise the government on the situation and monitor the development of the events. On February 25, 2 days after reporting the first case, a crisis committee was established for each Iraqi governorate. Moreover, Ministry of Health (MOH) established a technical advisory committee composed of many experts from the universities and the retired specialists to provide technical advice. Later the Prime Minister's Office reformed the higher committee and established a new advisory committee.

### Containment measures

**Border control** Border control was one of the first measures used by the Iraqi government to contain the spread of COVID-19. Tightening the measures at airports and border crossings were declared by the government about 3 weeks before the first case was detected in Iraq. Iraqis who were staying in Wuhan, China were allowed to return home. However, they were accompanied by medical teams and were quarantined on arrival, monitored, and followed up after entering the country. On 20 February 2020, Iraq banned travel to China, Iran, Japan, South Korea, Thailand, Singapore,

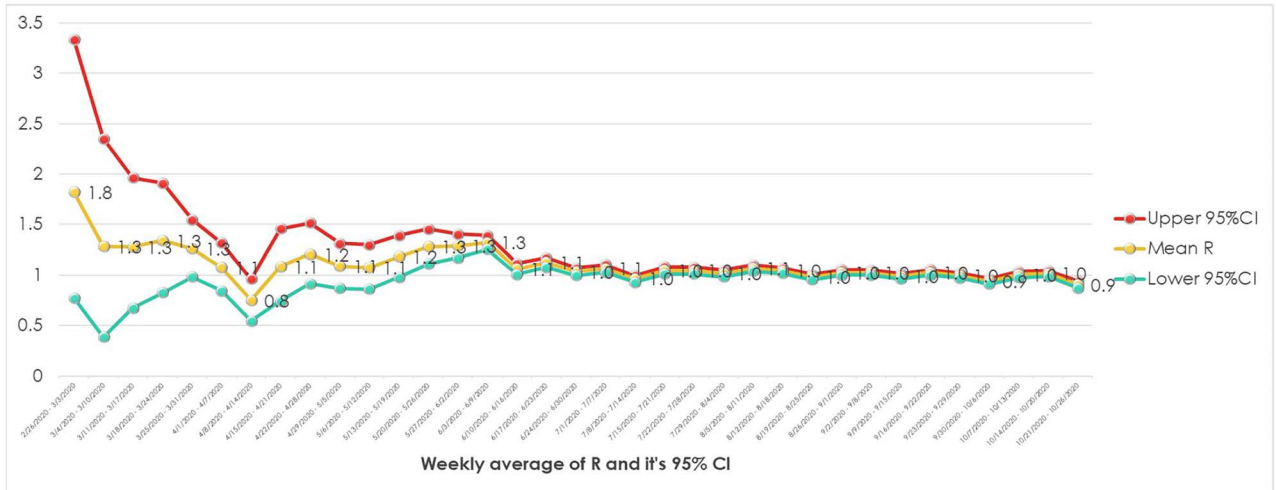


Fig. 4 Mean R and its 95% confidence interval by week.

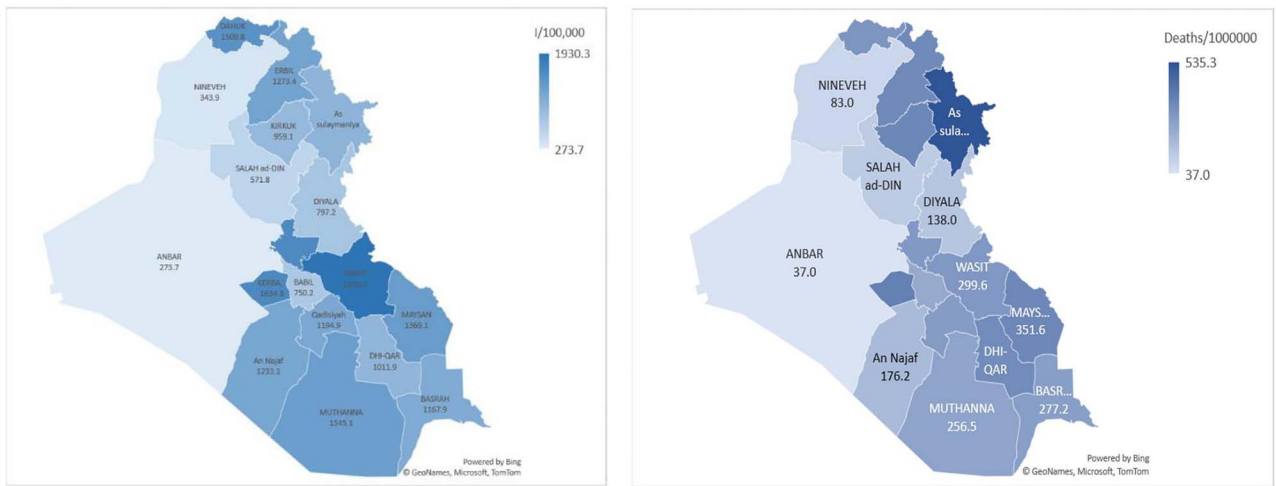
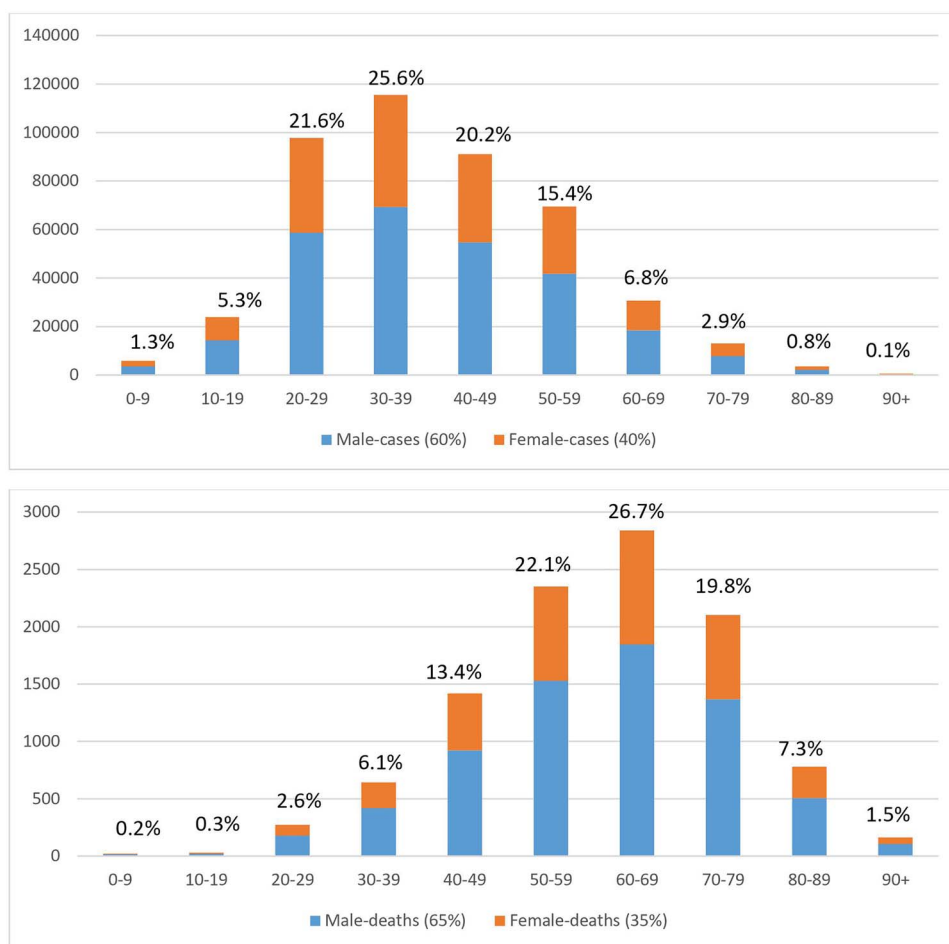


Fig. 5 Incidence of COVID-19 cases per 100 000 population (left) and mortality per 1 000 000 population (right) according to governorates, as of 25 October 2020.

Italy, Kuwait and Bahrain, as these countries reported a high number of COVID-19 cases. On the same day when the first COVID-19 case was reported (24 February 2020), the government authorized the Government Crisis Cell to ban Iranian nationals from entering the country and monitor the Iraqis returning from Iran. Also, the Border Crossings Authority formed a crisis unit to ensure that border crossings are prepared to test arrivals for COVID-19. In mid-March, all flights were suspended. Travel between Iraqi governorates was also prohibited on March 17. On April 9, further measures on how to deal with Iraqis returning from abroad were implemented as the Ministry of Interior became responsible for arranging the return of Iraqi nationals. Countries were classified into two groups: Group A—high risk (coming from countries reporting > 500 cases per

million). Iraqi nationals returning from these countries went through a medical examination and a quarantine for 14 days at medical centers. Group B—low risk (coming from countries reporting < 500 cases per million). Iraqi nationals returning from these countries went through a medical examination and COVID-19 tests. They were also required to sign an undertaking that is legally binding to observe self-isolation at home until the results come out.

The suspension lasted until July 7 when the government decided to permit traveling outside Iraq for Iraqis under several conditions (e.g. self-quarantine and taking a COVID-19 test on return). On July 23, Iraqi airports were allowed to reopen. Similarly, certain border crossings (Shalamchah, Mendali, Al-Mundhadiyah, Safwan and Al-Shib) were partially reopened for trade exchange.



**Fig. 6** Age group and gender distribution of COVID-19 cases and deaths.

**Table 2** Proportion of types of HCW infected with COVID-19

Job	N	%
Medical doctors	3310	14%
Pharmacists	1296	6%
Dentists	619	3%
Lab workers	2747	12%
Paramedical workers	11 148	48%
Others	3903	17%
Total	23 023	100%

**Curfew** A total curfew was imposed all over Iraq on March 17 and continued until April 20. During Ramadan, the curfew was partial on Sundays to Thursdays (from 7 p.m. to 6 a.m.) and total only on Fridays and Saturdays.

The total curfew was imposed again during Eid al-Fitr and continued for 3 weeks (May 22 to June 13 and Eid al-Adha.

After the Eid al-Adha holiday (30 July to 9 August), the curfew became partial on all weekdays, the weekend included.

The most probable rationale behind this variation in decisions is mere speculations of the pattern of Iraqi socialization behavior during Ramadan versus Eid (assuming people would socialize more during Eid). However, the surge in the number of cases just a week after Ramadan was, seen by many, due to this month-long relaxation of curfew measures.

#### Masks and social distancing enforcement:

Wearing masks in public is made obligatory, and the government declared that those not complying with the regulation will face legal consequences. Drivers of public transport vehicles were requested not to carry > 50% of the vehicle capacity and to be fined 50 000 dinars (US\$41) for violating these rules. Passengers not wearing face masks would also subject drivers to fines. People not wearing face masks in public were fined 10 000 dinars (US\$8). In shops and stores, only those wearing face masks are allowed in, 1 customer is allowed in



every 5 square meters. Shops' owners who do not comply with these rules should pay a fine of 100 000 dinars (US\$82) and jeopardize the closure of their shops.

Other early measures included not allowing restaurants to open (except for delivery) and a ban on public gatherings. On July 7, all private clinics were closed for 2 weeks. Ironically though, after about a week of that decision, shopping centers and malls were allowed to reopen under strict conditions. By the end of July, private clinics were allowed to reopen as well, also under strict conditions.

Disinfecting certain neighborhoods in Baghdad where high numbers of COVID-19 cases are reported was done now and then, despite the lack of a comprehensive approach or a scientific base.

### Case detection and tracing

*Isolation* At the beginning of the pandemic, patients were isolated at assigned health facilities, and contacts were quarantined at designated places. After the increase in reported cases, there was a shift in the policy; the quarantine of contacts was shifted to homes, and later the isolation of mild, moderate cases was made at home, leaving the hospitals for severe and critical cases. Later, with a further increase in cases requiring hospitalization that surpass the hospital's capacity and trending reports of a shortage of different medical supplies including oxygen in the hospitals, there was a general shift of the patients with different levels of severity towards home isolation and management by private practitioners.

*Labs and testing* At the beginning of the pandemic, there was full dependence on WHO in procuring PCR testing kits. Later, however, Kimadia (the state company for drug and medical appliances, Iraq Ministry of Health) started taking the lead.

Before COVID-19, the Central Public Health Laboratory (CPHL) in Baghdad was the only center capable of performing PCR tests. As of October 2020, around 50 laboratories in Baghdad and all Iraqi governorates have Rt-PCR testing capacity.

The MoH is just started to allow private labs to perform COVID-19 testing under the ministry's conditions. Now, the number of tests performed each day is illustrated in [Figure 2](#).

*Contact tracing* Rapid response teams have been established in all districts and they were responsible for contact tracing, mainly for close family contacts. Contacts, who were traced through home visits, were then kept under quarantine for 14 days, with a daily check of temperature and respiratory symptoms. PCR test for anyone with symptoms is performed, although some governorates did PCR for all contacts. A total of 161 149 contacts were tested and 124 302 of them tested positive (77.1%).

*Active surveillance* Iraq has started its active surveillance program in early May in high-risk areas. It was started to look for suspected cases in 50 houses around the index case in the area, if positive, a rapid test was done. PCR was done for those who were positive or highly suspicious. The kits used to perform the rapid test were from different sources including local and international suppliers. No proper assessment of the validity of the test was performed before using them.

### Risk communication

The Iraqi ministry of health has been communicating with the public about COVID-19 since the arrival of the pandemic to Iraq by issuing advice on basic preventive measures, posting educational materials on the ministry's social media pages, distributing brochures to HCWs, and hanging posters inside the MoH buildings. In Ramadan, the Crisis Cell advised the public on how to safely observe the holy month. Religious communities' leaders were involved in advising people on COVID-19 and avoiding large gatherings, especially before the major religious event.

However, there are a lot of gaps in communication and social mobilization that need to be addressed. Iraq is not an exception in the worldwide infodemic created by the COVID-19, but unfortunately, little is done to negate the myths, conspiracy theories, and claims of finding a cure for the disease. Even worse, medical doctors were behind most of these claims. Given the deeply rooted mistrust between the healthcare sector and the Iraqi people, many people tend to believe the other party other than the MoH.

### Economic measures

*Measures to ease the economic burden of the pandemic* Several measures were announced for this purpose. However, they were widely perceived by the Iraqi people as insufficient and all over the place rather than part of a well-studied plan. For example, on March 22 at one point, the government declared that it will not collect levies from residents and will not deduct loans from its employees, and repayment dues on residential land leased by the government were suspended.<sup>17</sup> Mortgage repayment and certain loans from the Central Bank of Iraq were suspended for 3 months.

These measures benefited only those who were privileged enough to be able to have loans and salaries in the first place. Labor workers and low-income families who are the most economically affected by the pandemic were automatically excluded from these measures.

For this segment of society, the government started an initiative to support Iraqis who were affected by the pandemic. A temporary monthly stipend was allocated for them via a

website specifically designed for this end (minha. iq). The application was open for a specific period from 11 April and 16 April (midday).

Although this was an innovative approach, however, it was temporary. Besides, it was accessible only by people with internet access and who know how to use computers. Even more, the fact that the application is only open for a certain time frame makes it more like a lottery competition than comprehensive governmental support where all citizens are supposed to enjoy equal opportunities to get the allocated benefits. Later, at the beginning of April, a committee was formed to monitor medical, food, and agricultural market needs and to ensure that the prices of essential goods remain stable.

### Management of oxygen crisis

In June, news started circulating about a severe shortage of oxygen supply in the Dhi-Qar governorate. A video clip from this governorate showing Iraqis standing in long lines waiting for oxygen supplies went viral on social media and sparked harsh criticism of the government accusing it of purposefully neglecting the governorate due to its vital role in the recent demonstrations.<sup>18</sup> The government tried to manage the crisis by allowing oxygen through all border crossings, suspending payments by MoH for these supplies, and buying supplies from neighboring Kuwait.<sup>19</sup> Besides, the WHO supplied Iraqi hospitals with 300 oxygen concentrators.

### Achievements and challenges

The early response to the pandemic was reasonably appropriate: Iraq has formed several committees at the levels of the Republic Presidency, Prime Minister Office, and the parliament. Meanwhile, another technical committee was developed to provide scientific guidance to the Minister of Health and later to the Supreme Committee for the National Health and Safety at the ministerial council. However, multiple committees might have weakened the fieldwork. By 29 January 2020, Iraq had banned all flights to and from China, and shortly afterward several other countries with a high number of COVID-19 cases were added to the ban. Immediately after reporting the first case on February 24, all schools and universities were suspended with restrictions on gatherings in public places (cinemas, cafes and social clubs). On March 15, all the points of entry on the borders with Iran were completely closed. On March 17, Iraq announced complete country closure and curfew that was extended till it was partially lifted on April 20. Also, there was an expansion in a test capacity, while Iraq had only the CPHL with the testing capacity for the COVID at the pandemic inception,

the number of the labs had increased. An average of 40 737 tests/week was performed until the end of June. Starting July, the rate of testing increased to 129 695 tests/week on average (218% increase). Still, the number of daily testing is far beyond the community's need and less than the figures in nearby countries. Meanwhile, there was an increase in bed capacity by providing 7000–8000 additional hospital beds through the support of other ministries and civil society. All these measures had helped to slow the possibility of an initial surge in the number of cases.

Furthermore, the Iraqi Ministry of Health has been closely monitoring the WHO COVID-19 related guidelines, implementing them whenever possible. It has also been issuing a frequently updated unified protocol for COVID-19 treatment on the country level. The protocol is frequently updated to keep up with the rapidly changing treatment options for COVID-19 worldwide. Iraq MOH worked closely with different agencies to ensure the availability of different medications, instruments, and other supplies in all Iraq hospitals that were involved in COVID-19 treatment.

Despite these early attempts to contain the pandemic, there have been many ongoing challenges that are facing Iraq from the beginning:

1. Since the beginning of the pandemic, the decision-making process was not merely based on a scientific basis alone, rather political input had a significant contribution. Many committees were established at different parts of the decision-making system in the country with overlapping powers. The WHO and many scientific institutions throughout the globe had issued certain criteria to reopen different sectors in the community.<sup>20,21</sup> In Iraq, despite the consistent reporting of a high number of cases, the fact that the positivity rate of PCR testing persistently exceeding 15% and R0 has been above 1 most of the time, yet the government is in favor of reopening the country.<sup>22</sup> The most prominent examples are airports reopening in July, the opening of malls and shopping centers in July, as well as the mosques, restaurants, cafes, parks and gardens in September.
2. There was a difficulty in implementing the containment measures appropriately due to the ever-lasting dilemma between economics, politics and health as well as the redundant executive authorities in the country. One only needs less than an hour of walking in Baghdad's streets to realize that compulsory mask-wearing, bans on gatherings, and even the brief total curfew measures are not in action. Also, illegal border-crossings are a well-known obstacle facing any attempt to adequately control borders.
3. The widespread conspiracy theories on COVID-19 in Iraq to the extent that many Iraqis think the pandemic



is only a political game, has played a major role in poor adherence to preventive instructions. This is mainly due to the inefficient public health education and social mobilization activities undertaken by MOH and the negative role of the public media that focused on the misconduct by some HCW.<sup>23</sup>

4. The already limited hospital and ICU capacities and the poor quality of healthcare provided to hospitalized patients had shifted the management from the hospitals to the patients' homes. Although WHO issued a guideline on home management of COVID-19 patients,<sup>24</sup> but in Iraq, this practice has many ramifications: underreporting of the number of cases as well as documenting deaths due to COVID-19 as due to other causes when they occur at home. Also, treating COVID-19 at home may contribute to the further spread of the virus in the community because isolation is not adequately practiced. Besides the unguaranteed quality, home treatment can have a huge financial burden on families.
5. Iraq is a country where one of the largest mass gatherings occurs. Although the one that happened this year was on a much lower scale compared to previous years, a large number of people attended and did not comply with the preventive practices. There is a need to come up with an organized system to cope with such gatherings.<sup>25</sup>
6. Different public health measures including active surveillance, contact tracing, isolation of cases, and quarantine of contacts were inadequately practiced after a while of its initiation. Since around mid-April, the rapid test was used as part of passive surveillance (on people seeking medical help at primary healthcare centers) instead of active surveillance.
7. Infection prevention and control (IPC) is one of the weakest areas in Iraq's response<sup>26</sup> and had contributed to the high number of cases among HCWs as well as patients' avoidance to seek help at hospitals.

## Conclusions

Iraq has started its response early (even before the arrival of the pandemic to the country) with several measures that helped delay the surge in the number of cases. However, starting in June, the problem started to escalate: the number of cases as well as deaths started to increase. This was followed by measures that might be counterproductive: gradual relaxation of total curfew until it was lifted and reopening airports and shopping malls. Even more, Iraq is being slow in taking the necessary steps (e.g. increase in testing capacity in line with the international standard and contact tracing) to compensate for these measures.

Several measures can help manage the current situation in Iraq. First, an emergency SOWT analysis or mid-action review to assess the situation and provide advice to handle the situation, provide written IPC guidelines, training of all HCWs, and supervise the implementation as a top priority. Second, an organized system to cope with mass gatherings. Ministry of Health and influential religious clerics have to agree on sending a strong message to encourage canceling physical attendance at mass gathering events. Third, new and innovative approaches in educating the public about COVID-19 through collaboration between media, MoH, and other stakeholders should focus on sending positive messages and clarify myths and rumors. Finally, a nationwide campaign to provide the COVID-19 vaccine to the Iraqi people is recommended. The Expanded Program on Immunization in Iraq (EPI) established in 1985 can lead the national efforts of this campaign. This should be accompanied by a supportive media campaign to enhance community buy-in and address potential causes of vaccine hesitancy.

The strength of this study comes from the fact that, unlike other parts of the world, there are limited national publications on the subject. Thus, this paper will be part of the institutional memory of the Iraqi healthcare system and serve as reference documentation of this period for future preparedness planning. This study has some limitations as well. We were unable to follow up on the extent of implementation and the impact of the governmental measures on the ground. Unlike many countries, Iraq does not use any electronic tool to identify and trace contacts. Finally, data from the Kurdistan region (an autonomous region in northern Iraq (and the Internally Displaced People (IDP) camps was not received in real-time and with inadequate details as the rest of Iraq, especially when it comes to hospitalized patients. Future research and action should consider these issues, particularly establishing electronic platforms to have real-time data and contact tracing from all Iraqi regions.

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