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One Year of COVID-19 Infection in Iraq and EMR Countries

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ABSTRACT

Background: The COVID-19 pandemic has affected the world for the last 20 months (January 2020–August 2021). It was troublesome and devastating in terms of cases, deaths and socioeconomic consequences while also being unpredictable in behaviour.

Objectives: To document the comparative profile of COVID-19 in Iraq and other Eastern Mediterranean countries in terms of time trend and three epidemiological parameters (incidence, case fatality and mortality rates).

Methods: A record-based prospective study. Data were checked daily throughout the study period from February 21, 2020 to February 23, 2021. The targeted numbers were recorded on an Excel sheet or Word table and updated daily over the specified period. The data covered the period from the onset of the pandemic in various countries. Data included the daily new cases of COVID-19 reported by various government agencies and ministries of health in the region, supported by two private websites. The multiple sources used assured cross-matching of reported figures, and a very high degree of consistency was achieved.

Results: The annual incidence rate, case fatality ratio and cause specific mortality rate in Iraq were 17,636.8 per million, 1.97% and 347.3 per million, respectively. These three rates were very variable among various Eastern Mediterranean countries.

Conclusion: Iraq and other countries in the region were struck harshly by COVID-19. Extensive variation in the major epidemiological parameters were documented. The pandemic uncovered major defects in the health care systems, and people around the world still await a hope to contain this unpredictable event.

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INTRODUCTION

Almost two years since the start of COVID-19 epidemic in China late December 2019, the outlook of the pandemic – which has spread to almost all countries[1–4] – at the global level is still not clear. The number of cases and resulting fatalities are increasing, and almost all countries are still fighting the virus by various means. Relatively early in the pandemic, a number of countries – China, South Korea, the United States, Italy, Iran, Spain, France, Turkey, United Kingdom, Germany and many other European and non-European countries – showed some features of evident containment after rapid spread of infection. Unfortunately, resurgence (second wave) was seen in most of the countries after experiencing massive decline. This resurgence was probably due to unlocking, changing weather and changing characteristics of the virus itself. In some countries like Russia, India, Brazil and Iraq, the first wave took a relatively long time before it slowed down. Only few countries have succeeded in maintaining a substantially low scale of new cases. Among the good examples are China, Taiwan, South Korea, Australia, New Zealand, Iceland, Singapore and Vietnam; the worst in this context are the USA, Brazil, India, Mexico and the UK.[5] Countries in the Eastern Mediterranean Region (EMR) are exhibiting a modest time trend of the pandemic. Until now, and after nearly one year of the start of case reporting in EMR countries, Iran has witnessed exponential increase very early in the course of the pandemic and continued to do so. Some other countries were reporting substantial number of cases in late spring and early summer of 2020 like Saudi Arabia, Qatar, Egypt, Oman and Iraq. The remaining countries showed a modest time trend, but some of them were potentially at risk of rapid increase of cases and, consequently, deaths as a result of the coronavirus infection. Examples of the latter are Palestine, Lebanon, Jordan, Tunisia and Morocco. At the global level, a second wave was severe in some countries like India, Turkey, Brazil, Iraq and others. EMR countries showed clear variation in the extent of risk of infection, case fatality and recoveries.

The reasons for these substantial variations across the world and within the EMR are not clear. Social behaviour and population response could be one reason. Initial pool of infection and reluctance to take decisive counteraction as early as the start of the pandemic are additional reasons for the rapid escalation of the disease and for some of the variation. Variation in intensity of testing for cases explains some of the variability in case reporting, at least for some of these countries.[6] Implementing the measures against the COVID-19 pandemic in most countries was extremely challenging and, therefore, needed extensive reconsideration to encompass not only health aspects but also the consequences of the pandemic on population living and country economics.[6] Careful planning to exit COVID-19 is needed, but this must be based on a thorough analysis of the situation.[7,8] One of the worse features of the COVID-19 virus is the tendency to mutate and, thus, the emergence of new variants. Based on one year's experience with COVID-19, countries were

very variable in preparedness, response and outcome in terms of incidence and mortality. The COVID-19 pandemic struck people all over the world regardless of age, gender or nationality. Greater risk, however, was reported in the elderly, people with chronic co-morbidity such as diabetes, hypertension, cardiovascular diseases and cancer. Such conditions undermine the body protections against invading pathogenic agents.[9–11] Evidence from a number of studies reported that males are at higher risk of severe courses of the disease.[12] Pregnant women also tend to experience severe presentation.[13] In general, COVID-19 tended to be less fatal as compared to its previous species of coronavirus.[14] It was also reported that psychological stress, obesity, poverty and ethnicity contributed to the aggravation of infection, complication and undesired outcome.[15]

Children are less vulnerable to infection with no or mild symptoms at least during the first waves of the pandemic.[16] Nevertheless, serological tests detected high viral load in respiratory as well faecal specimen obtained from children including infants.[17,18]

ABO blood group distribution was implicated in the package of risk factors of the COVID-19 infection. A study on evaluating the association between ABO blood groups and COVID-19 in Iraqi patients proposed a link between COVID-19 infection and blood group AB in the form of increased risk of infection; case fatality was relatively lower in blood group O.[19]

Earlier in the pandemic course, the prevailing assumption was that infection might be acquired through zoonotic or environmental exposure; later on, it was approved that human-to-human transmission is the main source of infection. The transmission is either by direct exposure to coughing and sneezing droplets from infected person or through face-to-face talks, where viral particles are expelled within respiratory droplets. The second route is indirect, as an infected individual may sneeze or cough on hands and then touch the surroundings with those contaminated hands. Thereafter, a healthy individual may touch those contaminated surfaces where viral particles may have survived for several days.[20] Presymptomatic transmission was also implicated in COVID-19.[21]

Regarding the incubation period, a wide range (3–24 days) was reported. A substantial proportion of affected persons developed clinical manifestations after five days of exposure, yet a significant proportion take up to 10 days to develop symptoms, mainly respiratory[22] but that may include also other symptoms like headache, general fatigue or atypical gastrointestinal presentation as nausea, vomiting, diarrhoea and anosmia.[23,24]

The epidemiological picture is not complete without understanding the high proportion of asymptomatic cases. In order to better comprehend this pandemic, asymptomatic transmission should be considered. Asymptomatic cases represent an important section of COVID-19 spread, as they may represent a hidden source of infection; they carry high risk for disseminating the virus to others.[25,26]

In Basrah, it was estimated that asymptomatic cases represent up to 50% of reported cases of COVID-19 during the early weeks of the pandemic.[11] Higher rates (80%) of asymptomatic cases were reported in China, and scientists declared that once such asymptomatic cases were identified, they have to be isolated for about 14 days to control the situation, as they were proved to spread the infection to others.[28,29]

The novel infection paralyzed all life aspects and demanded strong control measures to be placed. Very early in the pandemic, the World Health Organization (WHO) presented "guidance documents for countries", which was deemed as an essential aid in answering a frightening question of how to deal with the novel pneumonia situation. The basic instructions of the guide encompass: [30]

Advice on adopting practices on preventive and control measures of infection, investigations and diagnosis, and a statement on general travel issues, in addition to capacity building of countries to face the pandemic.

Leadership: The WHO took the lead to declare a pandemic situation on the basis of epidemiological situation criteria.

Science: Work was initiated under the leadership of the WHO to identify the causative agent, assess the risk at a global level and understand the level of knowledge and gaps regarding the pandemic.

Information and advice: Sharing information across the globe and advice became a feature of the epidemic control process.

The preventive means disseminated and highly recommended could be sorted in two types: First, the government's general instructions; they included complete or partial lockdown, no travelling, education suspension in schools and universities, and closure of shops and markets closure. Second, distinct personalized measures, which include personal hygiene, frequent cleaning of hands or using an alcohol-based skin sanitizer and consuming disposable tissues for coughing and sneezing. Moreover, the current pandemic state required individuals to adopt an additional attitude: social distancing, where individuals have to keep a distance of 3 to 6 feet between each other. Traditional greeting manners, handshakes and hugging were also forbidden.[31]

Furthermore, the ever-worsening situation entailed people to avoiding outdoor gatherings, and home visits became wise and fit the emerging situation.[32] Wearing a mask became a significant landmark in personal protection practices and was highly encouraged by all parties concerned with the COVID-19 pandemic.[33]

Among the many difficulties faced by all countries in handling the pandemic is the lack of effective treatment and immunization. This made it very essential to resort to a package of preventive measures, as stated above. Indeed, it was very clear that the obligation to all preventive measures is a matter of life. Governments all over the world made enormous efforts to apply fast and arranged preventive and control strategies along with epidemic investigations through contact tracing and increasing

hospital capacities to deal with ever-increasing cases.[34]

The consequences of most of the population-based preventive measures were associated with very important social and economic drawbacks. These necessitated a delicate balance between the urgent need to adopt preventive measures and implication of the latter on population life and living.

In Iraq, the same package of preventive measures was applied. The government started with variable degree of lockdown from 28 February 2020 onwards, but the measures could not be properly implemented hence, the outcome was not that satisfying, except in the early weeks of the pandemic.[36] Later, the country faced a severe wave that lasted for months, followed by a sharp decline in early October 2020. However, by late January 2021, another very severe wave started and continued until early July 2021. Population-based preventive measures have never been practiced perfectly in Iraq as in many other countries. Despite the evidence that social distancing was effective in lowering about 30% of COVID-19 incidence rate and up to 35% COVID-19 related death ratea,[37–38] it was difficult to enforce sustainable distancing.

Generally, people showed variable commitment to government instructions and adherence to health ministry advice regarding self-protection and minimization of infection spread. [39]

Immunization: Until this moment, no vaccine has been approved by the WHO or any other authorizing agency as a 100% routine vaccine. All authorization issued so far are emergency ones to combat the devastating pandemic. Enormous scientific efforts were made to produce vaccines that are immunogenic, effective, safe and feasible to apply. The world has succeeded to engage in a wide-scale collaborative work to produce vaccines. At this moment (7 May 2021), the WHO has approved the emergency use of six vaccines: Pfizer, the AstraZeneca, Moderna, Sinopharm, Johnson and Johnson and Indian vaccines (Serum Institute of India's Covovax and Biological E's Corbevax)

MATERIAL AND METHOD

The present study is prospective and record-based. The data used in this article covered the period from the onset of the pandemic in various countries in EMR to 23 February 2021. Data were obtained from sources containing the daily new cases of COVID-19 reported by various government agencies and ministries of health in the region supported by the WHO website[41,42] and private websites that reported cases for EMR and other world countries.[43,44] The multiple sources used assure cross-matching of reported figures, and a very high degree of consistency was achieved.

Numbers of cases were fed into an Excel sheet and, thus, graphs were made. A case of COVID-19 was defined according to specific criteria adopted by various countries in accordance with the WHO definitions. In general, a case denotes a person with a positive nasal or oral swab polymerase chain reaction (PCR) test. The triggers for the test were clinical features suggestive of the disease, contact with cases, active case

detection and history of travel to other affected countries. Data on the population of each country were obtained from world meters for population.[45]

The study design was officially approved by the Central Research Committee in Basrah Directorate General of Health, the Research Ethical Committee–College of Medicine–University of Basrah and Council of the College of Medicine, University of Basrah (Official Administrative Order No. 7/37l2656 dated October 5, 2020).

The statistical analysis covered:

a. Epidemiological outcome measurement including three parameters: [46]

***Incidence rate* (IR):** The number of reported cases per 1,000,000 populations up to 23 February 2021.

***Case fatality ratio* CFR):** The number of deaths among COVID-19 cases reported up to 23 February 2021 per 100 cases reported during the same period of time.

***Cause-specific mortality rate* (CSMR):** The number of deaths during the same reference period of time per million population as of 23 February 2021.

These epidemiological outcome parameters were calculated and compared for all EMR countries.

b. Comparative curves were prepared to display characteristics of COVID-19 epidemic curves in EMR Arab countries.

To smooth the curves, we used weekly instead of daily reported cases. For the purpose of comparison of Iraq and other Arab EMR countries, three groups of countries were included:

Group one: Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Qatar, Saudi Arabia and United Arab Emirates).

Group two: Three other Asian Arab countries (Jordan, Lebanon and Occupied Palestine).

Group three: Three North African Arab countries (Egypt, Morocco and Tunisia).

RESULTS

The extent of the COVID-19 pandemic at the national level

One of the important parameters of the dynamic of epidemics/pandemics is the measurement of the frequency of cases on daily/weekly basis. Figure 1 shows the pattern (time trend) of the daily cases in Iraq from the start of the pandemic on 24 February 2020 to the 23 February 2021. For almost 12 weeks, the pandemic was slow with little fluctuations. However, by the end of May 2020, a clear scaling up was observed, which continued until late September, when signs of decline were observed. The initial escalation was coincident with the end of Ramadan month and Eid Al-Fitr. A second escalation was noticed in relation to Eid Al-Adha. An expected flare up was anticipated with the mass gathering for the Ashura and Al-Arbaen Visit, but this did not happen. The highest daily number of 5,055 cases was reported on 23 September 2020. A declining trend was clear since the beginning of October 2020, which was broken by a sharp new wave that continued until the moment we drafted this article.

The case fatality ratio shows a declining trend from as high as 9.6% on 26 March 2020 to as

low as 1.9% by the end of February 2021 (Fig. 2).

The burden of the disease on the population in terms of cause-specific mortality rate is enormous and clearly described in Fig. 3. The pattern is characterized by initial low scale mortality followed by sharp increase and then tends to level down, but by the end of February, a signal of relative increase can be seen.

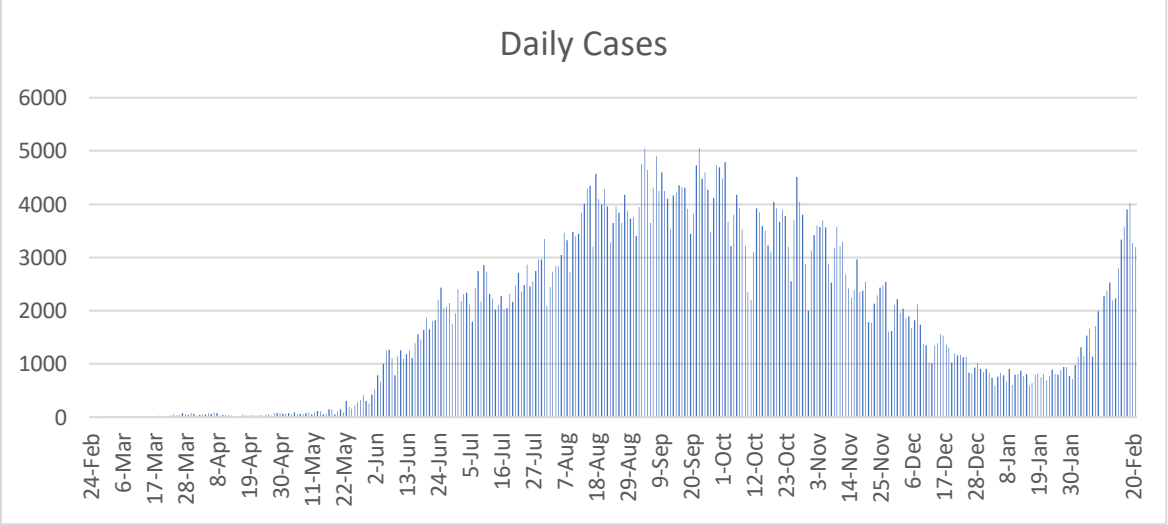

Figure 1: Daily cases of COVID-19 infection in Iraq (February 2020 – February 2021)

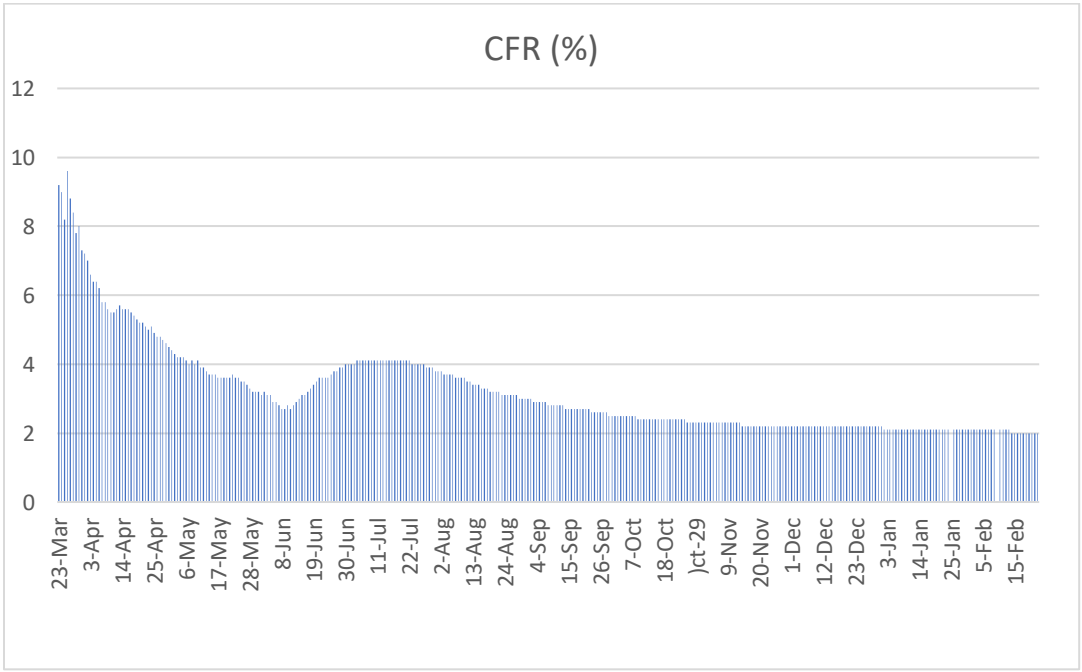

Figure 2: Case fatality ration (CFR as %) of COVID-19 in Iraq over a one-year period (23 March 2020– 23 February, 2021)

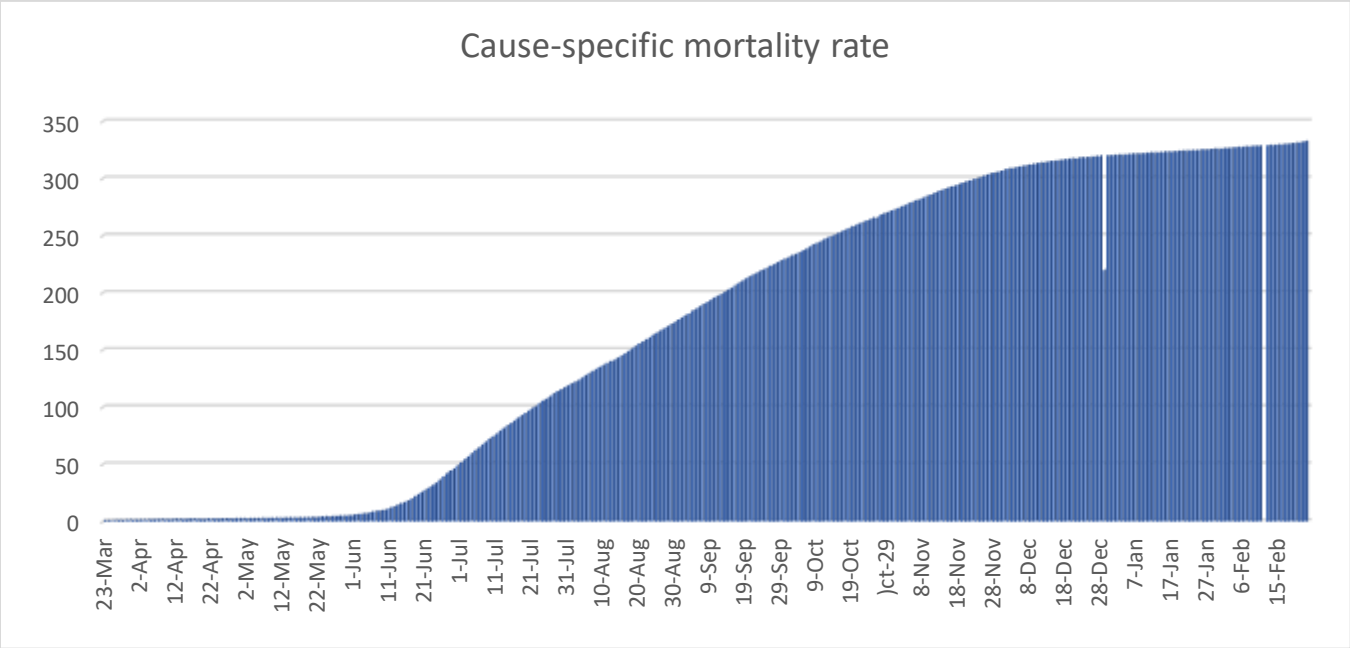

Figure 3: Cause-specific mortality rate of COVID-19 infection in Iraq over a one-year period (24 February 2020–23 February 2021)

Comparative epidemic curves of Iraq and selected Arab EMR countries

Figure 4 displays the epidemic curves for Iraq and GCC. The pattern does not exhibit any uniform pattern. Earlier peaks appeared in the complete GCC. Iraq has a relatively delayed peak. All countries showed sustained decline in their epidemic curve except the UAE, which witnessed an initial peak followed by decline but rising again from the end of August 2020. All countries in this group experienced a new wave by the beginning of the year 2021.

Figure 5 presents comparative epidemic curves for Iraq and three other Asian Arab countries (Jordan, Lebanon and Palestine). The three countries tended to have relatively similar epidemic curves but different from the curve in Iraq in certain aspects. All the three countries succeeded in maintaining low scale of cases for a longer period than Iraq. However, later, they experienced the first major wave at a time Iraq was showing a declining trend. All the four countries entered a new wave by the beginning of February 2021.

The comparative epidemic curves for Iraq and three Northern African Arab countries (Egypt, Tunisia and Morocco) are shown in Fig. 6. Each country has its own characteristic curve, though all share fluctuation.

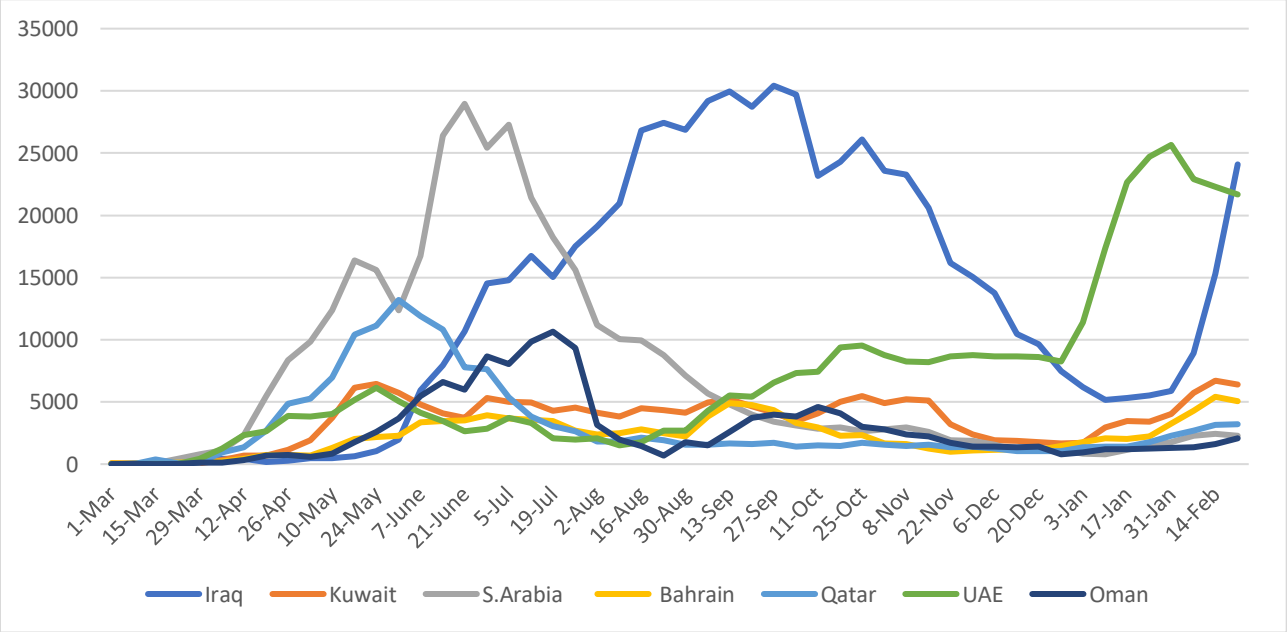

Figure 4: Comparative epidemic curves of weekly COVID-19 infection in Iraq and Gulf Cooperative Countries over one year (24 February 2020–23 February 2021)

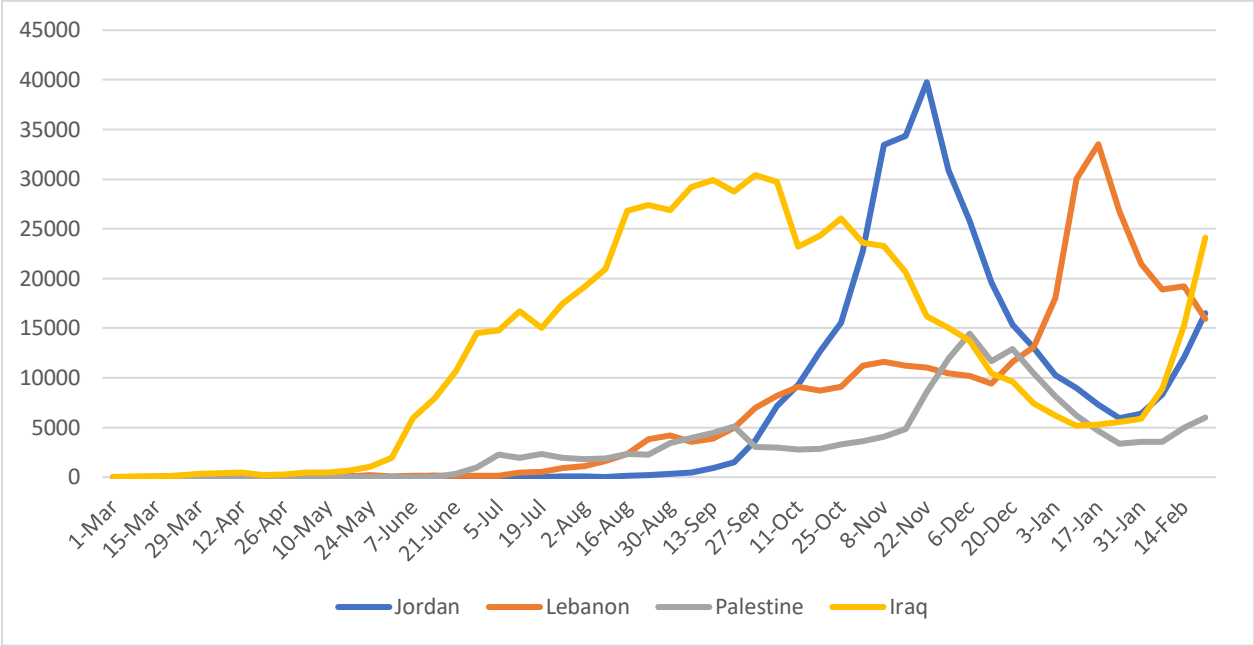

Figure 5: Epidemic curve of weekly COVID-19 infection in Iraq, Jordan, Lebanon and Palestine over one year (24 February 2020–23 February 2021)

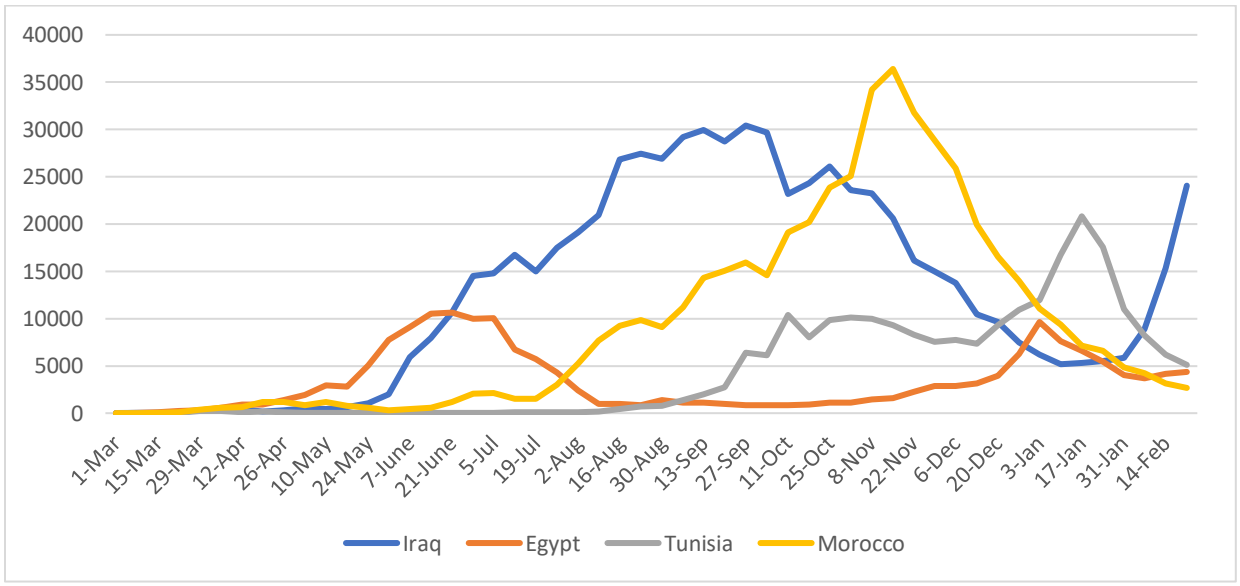

Figure 6: Epidemic curve of weekly COVID-19 infection in Iraq, Egypt, Tunisia and Morocco over one year (24 February 2020–23 February 2021)

Selected epidemiological outcome parameters of COVID-19 in EMR countries

Table 1 shows the total population, total cases and total deaths in one year, in addition to three epidemiological parameters for all EMR countries. The incidence rate ranged from the lowest of 73.3 per million in Yemen to the highest of 70,559.3 per million in Bahrain. Iraq had an incidence rate of 16,882.7 per million, occupying the rank 12 from highest to lowest (Fig. 7).

Regarding the case fatality ratio (Fig. 8), it seems in clear evidence that Yemen is the most vulnerable country to the severity of COVID-19, with a CFR of 28.3%, whereas all other countries had barely touch or just exceeded the level of 6% of CFR. Iraq ranked the 10th in this classification when countries are put in order from highest to lowest CFR.

Regarding the cause specific mortality rate, countries can be assorted into three groups: countries with CSMR less than 100 deaths/million which include Somalia, Yemen, Sudan, Pakistan, Syria, Afghanistan, Djibouti and Qatar; Lebanon, Tunisia and Iran experienced the highest CSMR, more than 500/million; Iraq documented a CSMR of 332.4/million as the 6th affected country among all EMR countries ranking from highest to lowest CSMR (Fig. 9).

Table 1: Extent of COVID-19 risk in Iraq and all EMR countries for one year (From 24 February 2020–23 February 2021).

Country	Population A	COVID- 19 cases during 2020 B	COVID-19 Deaths during 2020 C	IR/10 B/A	CFR(%) C/B	CSMR/10 C/A
Afghanistan	38,751,038	55,664	2,436	1,436.5	4.4	62.9
Bahrain	1,689,430	119,205	433	70,559.3	0.36	256.3
Djibouti	988 000	6,052	63	6,125.5	1.04	63.8
Egypt	101,945,728	179,407	10,443	1,759.8	5.82	102.4
Iran	83,777,961	1,590,605	59,663	18,986.0	3.75	716.1
Iraq	40,039,919	675,982	13,311	16,882.7	1.97	332.4
Jordan	10,182,948	372,417	4,589	36,572.6	1.23	450.7
Kuwait	4,257,912	186,004	1,057	43,684.3	0.57	248.2
Lebanon	6,831,433	359,337	4,446	52,600.5	1.24	650.8
Libya	6,852,594	130,701	2,125	19,073.2	1.63	310.1
Morocco	36,823,190	481,709	8,564	13,081.7	1.,78	232.6
Oman	5,080,263	139,989	1,557	27,555.5	1.11	306.5
Pakistan	220,027,847	573,384	12,658	2,606.0	2.21	57.5
Palestine	5,077,406	198,937	2,195	39,180.8	1.1	432.3
Qatar	2,871,278	161,344	257	56,192.4	0.16	89.5
Saudi Arabia	34,705,096	375,668	6,470	10,824.6	1.72	186.4
Somalia	15,893,222	6,246	208	393.0	3.33	13.1
Sudan	43,641,982	28,210	1,876	646.4	6.65	43.0
Syria	17,414,481	15,282	1,004	877.5	6.57	57.7
Tunisia	11,793,963	229,751	7,843	19,480.4	3.41	665.0
UAE	9,866,529	375,535	1,145	38,061.5	0.30	116.0
Yemen	29,825,964	2,187	620	73.3	28.35	20.8
Total for EMR	728,338,184	6,028,545	142,963	8,277.1	2.37	196.29

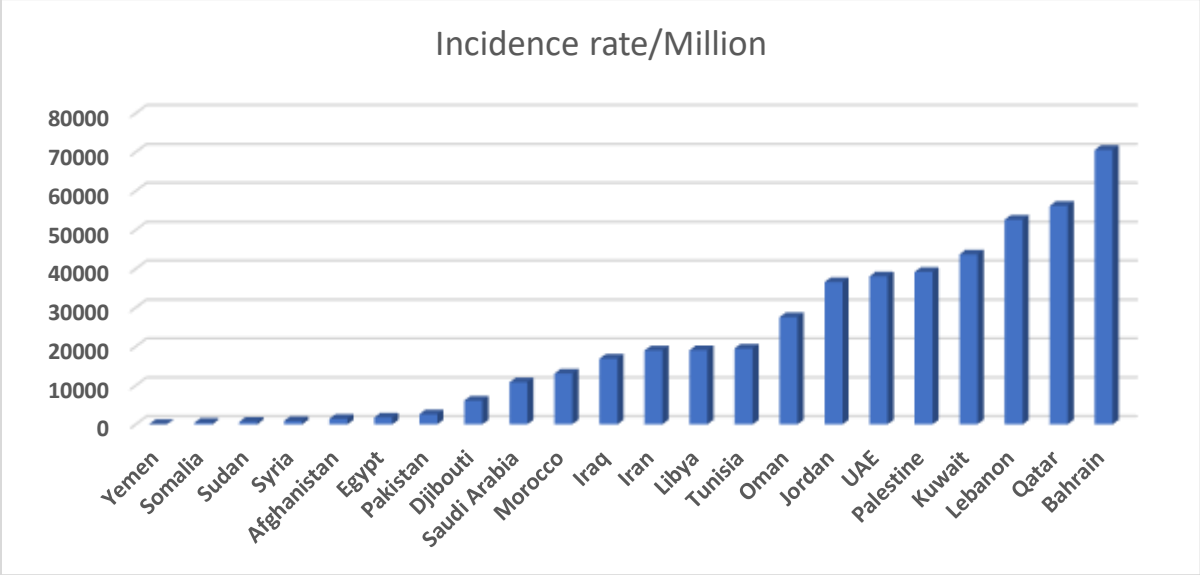

Figure 7: Ranking of EMR countries according to the annual incidence rate of COVID-19 infection.

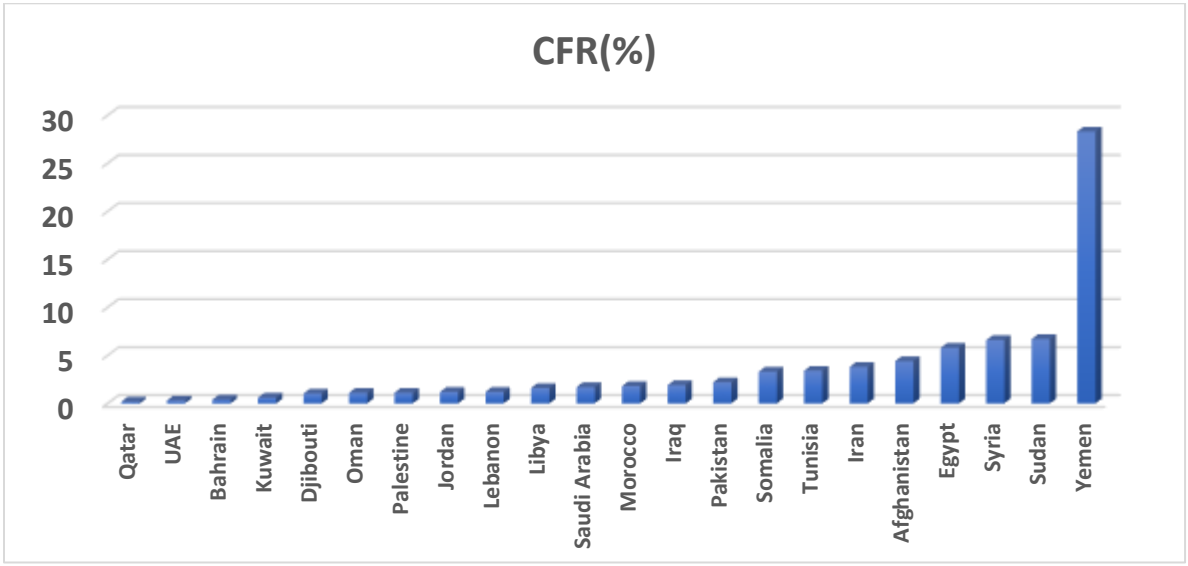

Figure 8: Ranking of EMR countries according to case fatality ratio (%) over one year (February 2020 – February 2021

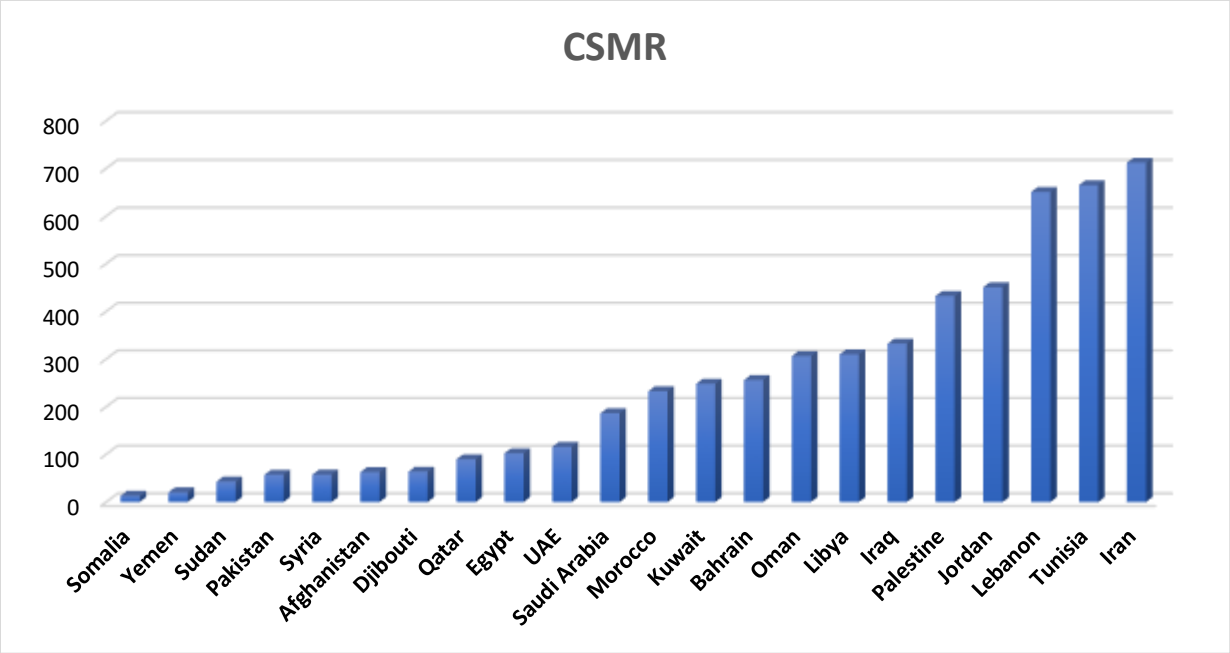

Figure 9: Ranking of EMR countries according to annual cause-specific mortality rate per Million population

DISCUSSION

Across the first year of the pandemic, the epidemic curve of COVID-19 in Iraq could be defined in three parts: Firstly, the early months of the pandemic (precisely the first 15 weeks) when Iraq succeeded in the containment of the pandemic with a low COVID-19 infection rate, where daily cases reached about 500 cases. That could be due to public awareness, adherence to the personal preventive measures as hand washing and wearing masks, the early application of lockdown and the restrictions of mass gathering.

Secondly, then after and even with continuous complete lockdown, people recklessness and underestimation of the novel life-threatening COVID-19 led them to break the movement restriction rules. Where open entertainment spaces were closed by the government, families gathered in closed ones, celebrating Eid-Al-Fitr, resulting in the possibility of acquiring the infection and the risky complications. All of that brought about the rapid increment in Iraq's infection curve that persisted upward for around 26 weeks.

The first year of the pandemic witnessed the registration of an annual incidence rate of 17,636.8 cases per million, 1.97% case fatality and 347.29 per million was the mortality rate.

This pattern was within the reported pattern in various countries in the world, though the picture is changing over time. To mention some comparative examples, in the United states, higher numbers of incident cases and deaths as well as rates were reported over the same period. New York state experienced the worst situation in cases, deaths and positivity rates.[47]

The epidemiological parameters in Iraq were much lower than corresponding figures reported in Western European countries such as the United Kingdom, Italy, Spain, Germany, France, etc). Actually, the latter countries were almost always occupying the top ranks in reported cases and deaths. Compared to EMR countries, and Turkey, Iraq occupied an intermediate rank. It is hypothesized that variations with place are likely to reflect [48–51]

1. Virulence of the virus (biological behaviour of the virus)
2. People's behaviour and adherence to preventive measures
3. Public health interventions and means of enforcement of these interventions
4. Climatic conditions with probable effects on transmission
5. Proportion of elderly people and people with co-morbidity might have adversely affected risk of acquiring infection and clinical course and outcome of infection
6. Could it be postulated that genetic susceptibility is different in different population and this may explain variation in incidence rate and severity?

These results are not unique to Iraq. Actually, the pattern tended to prevail in various countries, For example, the United Kingdom,[52] Europe,[53] China[54] and Brazil.[55] The explanation of the variation is complex and involves demographic characteristics, socioeconomic differentials, public health interventions and people response and adherence to recommended preventive measures and behaviours.[52–54] Effective policymaking is another issue in explaining variability in epidemiological parameters of COVID-19.[55]

The epidemiological picture in Iraq is incomplete without considering it within the regional domain. Therefore, it is logical to explore the extent of variation in the pattern of the pandemic among EMR countries and to search for any possible explanation for such variation (if any).

At an early stage of the pandemic, Alwahaibi et al. (2020)[56] came with the conclusion that most EMR countries succeeded in the efforts to control the pandemic and kept the curves flat; this was very true for most of EMR Arab countries. However, the risk of escalation remained high towards the summer and autumn of 2020. Similar results highlighted that most of the countries exhibited an accelerated pandemic with some signs of decline, but few were experiencing continued rise or resurgence, and re-emergence of threats was impending.[27] A strong warning was expressed that without careful scientific evidence, re-opening was a real challenge to EMR countries.

Examination of the current package of epidemiological parameters and time trend epidemic curves in EMR countries, as shown in this article, will definitely lead to the impressions that the pattern is very variable and hard to explain. Factors which were stated earlier in this discussion may be applicable to the situation across EMRO. To re-iterate, public health interventions including scale of testing for COVID-19 cases, population behaviour, completeness of case reporting and registration and pressure

of economic factors are important determinants of the scale of the pandemic among various countries.[56–57] Some countries have been suffering from major political and economic difficulties in preparing the health system: Yemen, Syria, Libya and Sudan. However, the difference in governmental decisions in rapid wise border closure and lockdown could have played a role along with the rigid performance of movement prohibition as in Saudi Arabia and Jordan. Reluctance to adhere to such strict measures have an opposite effect.[56–57]

In conclusion, COVID-19 is a devastating infectious disease at all levels. Its effects in terms of morbidity and mortality are enormous and very variable. The patterns at spatial and temporal levels are not easy to predict. The characteristic fluctuations are likely to reflect factors related to virus behaviour, population behaviour and public health interventions.

Conflict of interest

None to declare.

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