



Concept note

Covid-19 and Iraq: The exponential epidemic

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ABSTRACT

The coronavirus disease 2019 (Covid-19) epidemic, which originated in Wuhan, China, has now extended to more than 200 countries and administrative regions infecting nearly 36,792,906 individuals of all ages as of 9 October 2020. Many of these articles pursue to investigate the epidemiological parameters of the disease at different locations to disseminate critical information among both modellers and policymakers for a timely control response to be implemented. Iraq has had 394,566 confirmed cases with 9,683 deaths according to the last update registration of Iraq Ministry of Health. In the infected region, despite unusual efforts to limit the movement of people at the expense of the Iraqi economy, we are dealing with an even greater fear that the number of patients who present to the emergency room will become much greater than the system can cope with. Finally, our analysis tends to suggest that measures to reduce transmission should certainly be implemented, as our government did on March 9, by inhibiting people's movement and social activities, unless strictly required. The most effective way to contain this viral outbreak in Iraq is probably to avoid close contact at the individual level and social meetings.

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INTRODUCTION

The coronavirus disease 2019 (Covid-19) epidemic, which originated in Wuhan, China, has now extended to more than 200 countries and administrative regions infecting nearly 36,792,906 individuals of all ages as of 9 October 2020 (Al-Kuraishy et al., 2020a). Though most infected individuals exhibit mild symptoms including fever, upper respiratory tract symptoms, shortness of breath, and diarrhoea or are asymptomatic in sum. However, severe cases of infection can lead to pneumonia, multiple organ failure, and death (Al-Kuraishy et al., 2020b). Generally, at least 1,067,468 deaths have been directly attributed to Covid-19, and this number is expected to rise with the ongoing epidemic. Pretentiousness a significant global health threat, Covid-19 has drawn unparalleled attention from public health researchers around the globe, with more than 200 research articles published in academic journals in two months. There are also nearly 350

epidemiological and modelling preprints on Covid-19. Many of these articles pursue to investigate the epidemiological parameters of the disease at different locations to disseminate critical information among both modellers and policymakers for a timely control response to be implemented. This is chiefly critical as the present outbreak involves a new pathogen SARS-CoV-2 (Fig. 1), on which limited knowledge exists of its infectivity and clinical profile. The current estimates from this research vary widely, partly due to the differences in analytical methods and assumptions. This variance is also reflected in the estimates on the effectiveness of public health interventions implemented worldwide (Al-Kuraishy et al., 2020c).

COVID-19 IN IRAQ

The countries that have been unsuccessful enough to have been exposed to this disease already have, paradoxically, very valued lessons to

pass on. Although the containment measures implemented in China have at least for the moment reduced new cases by more than 90%, this reduction is not the case in other countries, including Iraq and Iran (Al-Kuraishy et al., 2020d).

Iraq has had 394,566 confirmed cases with 9,683 deaths according to the last update registration of Iraq Ministry of Health. The mean age of those who died in Iraq was 71 years and more than two-thirds of these patients had diabetes, cardiovascular diseases, or cancer, or were former smokers. It is, therefore, true that these patients had underlying health conditions, but it is also worth noting that they had acute respiratory distress syndrome (ARDS) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pneumonia, needed respiratory support, and would not have died otherwise (Al-Kuraishy et al., 2020e).

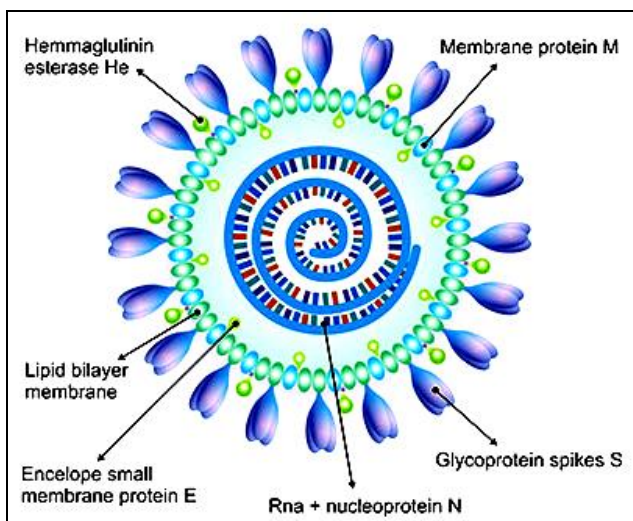


Fig. 1. Structure of SARS-CoV-2

On February 2, 2020, the Iraq Government implemented extraordinary measures to limit viral transmission, including restricting movement in the infected regions to minimize the possibility that people who are not infected come into contact with infected people. This decision is certainly brave and important, but it is not enough. At present, our national health system's capacity to effectively respond to the needs of those who are already infected and require admission to an intensive care unit for ARDS, largely due to SARS-CoV-2 pneumonia, is a matter of grave concern. Specifically, the percentage of patients admitted to intensive care units reported daily in Iraq was consistently between 1% and 2% of patients who were actively infected (Al-Kuraishy and Al-Gareeb, 2020).

In Iraq, we have about 120 beds in intensive care units. Of those, as of April 11, most of them are already devoted to patients with SARS-CoV-2 infection, and soon this number will progressively increase to the point that thousands of beds will soon be occupied by patients with COVID-19.

Given that the mortality of patients who are critically ill with SARS-CoV-2 pneumonia is low and that the survival time of non-survivors is one week, the number of people infected in Iraq will perhaps execute a major tension on critical care facilities in our hospitals, some of which do not have adequate resources or staff to deal with this emergency (Al-Kuraishy et al., 2020f).

In the infected region, despite unusual efforts to limit the movement of people at the expense of the Iraqi economy, we are dealing with an even greater fear that the number of patients who present to the emergency room will become much greater than the system can cope with. The number of intensive care beds necessary to give the maximum numbers of patients the chance to be treated will reach several thousand, but the exact number is still a matter of discussion among experts. Health-care professionals have been working day and night since Feb 20, and in doing so some of them have become infected, and some have died. The Iraq Ministry of Health responded to the lack of beds for patients with COVID-19 by sending patients who need intensive care but are not infected with COVID-19 to other hospitals (Al-Kuraishy et al., 2020g).

Meanwhile, the number of infected patients increased exponentially in the October herald unpredictable disaster (Fig. 2).

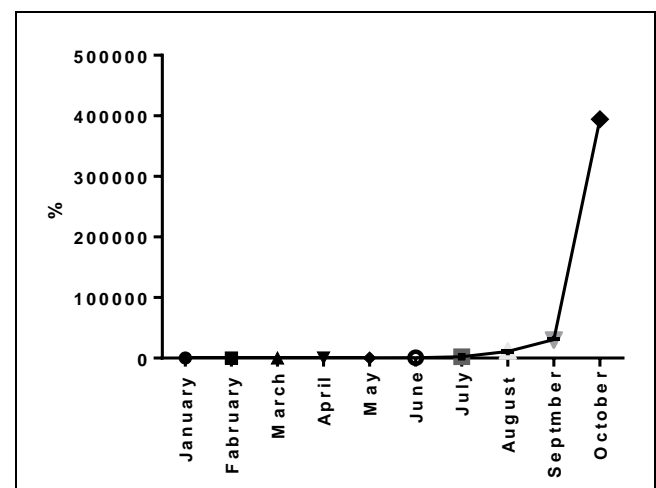


Fig. 2. Cases of COVID-19 infected patients in Iraq

PREDICTIONS AND HOPES

We present the following predictions to prepare our political leaders those who bear the greatest responsibility for national health systems and the government at the regional level, as well as local health authorities for what is predicted to happen in the days and weeks to come. They can then implement measures regarding staff resources and hospital beds to meet the challenges of this difficult time.

Official numbers of infected people during the COVID-19 virus outbreak in Iraq are indicative of the spread of the infection, and of the challenges

that will be posed to Iraqi hospitals and, in particular, intensive care facilities. The number of patients who are infected has been published daily since Feb 2, 2020.

It is possible to fit the available data for the number of patients who are actively infected into an exponential model, as reported in figure 2. The value of the exponent can be computed as 1 per day and is consistent with the number of infected patients reported by the Iraqi Health Ministry. The consistency between the exponential prediction and the reported data is very close. If the increase in the number of infected patients follows this trend for the next weeks, there will be more than 500, 000 patients infected by December 2020. Prediction and the assumption that the duration of infection ranges from 15 to 20 days, it is possible to calculate that the basic reproduction number ranges from 2-3.

This number is similar to that reported for the initial phase of the infection outbreak in the city of Wuhan, China (Li et al., 2020). The number of patients admitted to intensive care units increased similarly in Iraq, with an exponential trend up until March 8. The best fit of the data reported by the Iraqi Ministry for Health can be obtained using the same exponent that best fits the number of infected patients. We can predict with quite a good degree of accuracy that this number will push the national health system to full capacity in a matter of days.

This situation is difficult, given that the number of patients who will need to be admitted to the intensive care unit is predicted to further increase after that date. At this point, the most important question is whether the increase in the number of patients who are infected and that requiring intensive care admittance will continue to rise exponentially and for how long. If the change in the slope of the curve does not take place soon, the clinical and social problems will take on uncontrollable dimensions, which are expected to have catastrophic results. The only way we can make such predictions is by comparing the trends in the data collected in the Hubei region in China for COVID-19 infection with that for the Iraqi population. From the official report of the WHO China Joint Mission on Coronavirus Disease 2019, it is possible to derive the cumulative curve of the patients who are infected from the start of the data series (Alavi-Moghaddam, 2020).

If the Iraqi outbreak follows a similar trend to that in China, we can suggest that the number of newly infected patients might start to decrease within 3–4 days from March 11. Similarly, we can foresee that the cumulative curve of infected patients will peak 30 days later, with the maximum load for clinical facilities for the treatment of these patients foreseen for that period. The most difficult prediction is the maximum number of infected patients that will be reached in Italy and, most importantly, the maximum number of patients who will require intensive care unit admission. This prediction is of crucial importance to plan for new

facilities in Iraqi hospitals and to calculate the period in which they need to be available. On the basis that the region of Hubei in China has a slightly smaller population than Iraq (Approximately 50 million in Hubei and 36 million in Iraq), we tentatively assumed that the trend for the maximum number of patients who are actively infected would be similar in the two territories. In doing so, we cannot overlook the fact that the effect of travel restrictions on the spread of the COVID-19 outbreak and the extraordinary community measures taken within and outside of Wuhan is unlikely to be replicated elsewhere.

Moreover, the current approach to these patients in Iraq implies non-pharmacological and pharmacological interventions, including antiretroviral medication, which might be different from the Wuhan outbreak, and could distort the calculation. We also realize that there is heterogeneity in the transmission dynamics between the city of Wuhan and elsewhere in the province, where the number of people who are infected remains lower (Xu et al., 2020).

Therefore, it might not be unrealistic to assume that what is going to happen in Iraq soon might mirror what happened in Hubei. Of course, it would have been more appropriate to directly compare Greater Wuhan (19 million people) with the region of Iraq.

We do not currently have additional evidence we can take into consideration to make more robust assumptions regarding the exact number of patients who will be infected in the future days or weeks. According to our prediction, we have only a few weeks to achieve this goal in terms of procuring personnel, technical equipment, and materials. These considerations could have similar numbers of patients infected and similar needs regarding intensive care admissions.

Since 1965, Iraq has had the privilege of having a national health system, its principles and organization derive from the British National Health Service model, and it is based on three fundamental principles. The first principle is universality all citizens have an equal right to access services provided by the national health system. The second is solidarity every citizen contributes to financing the National Health Service based on their means, through progressive taxation. The third is uniformity the quality of the services provided by the National Health Service to all citizens in all regions must be uniform. All individuals are supposed to pay for it as taxpayers, each person giving a little to receive a lot in return if they become unwell (Al-Kuraishy and Al-Gareeb, 2019).

CONCLUSION

In theory, we are in a better position than many other countries to react to the current outbreak. However, an aggressive approach needs to be

taken with patients who are critically ill with SARS-CoV-2, often including ventilatory support. The system's capacity to respond to changing circumstances has been under enormous pressure, at least in the Lombardy region, where two clusters have already emerged since February. We predict that if the exponential trend continues for the next few days, more than 2500 hospital beds for patients in intensive care units will be needed in only 1 week to treat ARDS caused by SARS-CoV-2-pneumonia in Iraq.

These measures are a step in the right direction, but our model tells us that they need to be implemented urgently, in a matter of days. Otherwise, a substantial number of unnecessary deaths will become inevitable. Intensive care specialists are already considering denying life-saving care to the sickest and giving priority to those patients most likely to survive when deciding who to provide ventilation to. This attitude has already been criticized by many doctors who, in a recent declaration to lay press stated that the Constitution recognizes the right of every individual to receive all necessary health care. They might not recognize that the reality is that intensive care wards are overflowing with patients and that COVID-19 is not a benign disease. Our doctors and nurses are modern heroes in an unexpected war against a difficult enemy. Soon, they will have no choice. They will have to follow the same rules that health-care workers are left within conflict and disaster zones. We hope that the present analysis will help political leaders and health authorities to move as quickly as they can to ensure that there are enough resources, including personnel, hospital beds, and intensive care facilities, for what is going to happen in the next few days and weeks. Finally, our analysis tends to suggest that measures to reduce transmission should certainly be implemented, as our government did on March 9, by inhibiting people's movement and social activities, unless strictly required. The most effective way to contain this viral outbreak in Iraq is probably to avoid close contact at the individual level and social meetings.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

REFERENCES

Alavi-Moghaddam M (2020). A Novel Coronavirus Outbreak from Wuhan City in China, Rapid Need for Emergency Departments Preparedness and Response;

a Letter to Editor. Archives of Academic Emergency Medicine, 8, e12.

Al-Kuraishy HM, Al-Gareeb AI (2019). Effects of rosuvastatin on metabolic profile: Versatility of dose-dependent effect. Journal of Advanced Pharmaceutical Technology & Research, 10, 33–38.

Al-Kuraishy HM, Al-Gareeb AI (2020). From SARS-CoV to nCoV-2019: Ruction and argument. Archives of Clinical Infectious Diseases, 15, e102624.

Al-Kuraishy HM, Al-Gareeb AI, Monteiro MC, Al-Saidy HJ (2020g). Brain injury and SARS-CoV-2 infection: Bidirectional pathways. Current Medical and Drug Research, 4, Art. ID 207.

Al-Kuraishy HM, Al-Maiah TJ, Al-Gareeb AI, Musa RA, Ali ZH (2020c). COVID-19 pneumonia in an Iraqi pregnant woman with preterm delivery. Asian Pacific Journal of Reproduction [Epub ahead of print]. Online available at <http://www.apjr.net/preprintarticle.asp?id=282984>.

Al-Kuraishy HM, Al-Naimi MS, Lungnier, CM, Al-Gareeb AI (2020f). Macrolides and COVID-19: An optimum premise. Biomedical and Biotechnology Research Journal, 4, 189-199.

Al-Kuraishy HM, Al-Niemi MS, Hussain NR, Al-Gareeb AI, Al-Harchan NA, Al-Kurashi AH (2020a). The potential role of renin-angiotensin system (RAS) and dipeptidyl peptidase-4 (DPP-4) in COVID-19: Navigating the uncharted. In: Selected chapters from the renin-angiotensin system, Kibel A (Ed). IntechOpen, London, pp. 151-165.

Al-Kuraishy HM, Hussien NR, Al-Naimi MS, Al-Buhadily AK, Al-Gareeb AI, Lungnier CM (2020b). Is ivermectin-azithromycin combination the next step for COVID-19? Biomedical and Biotechnology Research Journal, 4, S101-103.

Al-Kuraishy HM, Hussien NR, Al-Naimi MS, Al-Buhadily AK, Al-Gareeb AI, Lungnier C (2020e). Renin-Angiotensin system and fibrinolytic pathway in COVID-19: One-way skepticism. Biomedical and Biotechnology Research Journal, 4, S33-40.

Al-Kuraishy HM, Sami OM, Hussain NR, Al-Gareeb AI (2020d). Metformin and/or vildagliptin mitigate type II diabetes mellitus induced-oxidative stress: The intriguing effect. Journal of Advanced Pharmaceutical Technology & Research, 11, 142-147.

Li S, Song K, Yang B, Gao Y, Gao X (2020). Preliminary Assessment of the COVID-19 Outbreak Using 3-Stage Model e-ISHR. Journal of Shanghai Jiaotong University, 25, 157–164.

Xu X, Chen P, Wang J, Feng J, Zhou H, Li X, Zhong W, Hao P (2020). Evolution of the novel coronavirus from the ongoing Wuhan outbreak and modeling of its spike protein for risk of human transmission. Science China, 63, 457-460.

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