

Coronavirus Disease-19 Outbreaks In Iraq: A Case Report

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Research Article

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Abstract

Coronavirus is a new pandemic disease that has emerged in Wuhan, China, and then spreads around the world. The cases number of the COVID-19, which have been daily reported in Iraq, has risen slowly. However, no confirmed study has been undertaken to evaluate the situation of the COVID-19 in concerning the confirmed cases, death cases, and recovered. The current study is undertaken to describe and assess the COVID-19 of the present situation in Iraq out of the range of the confirmed, deaths and recovered cases from the date 21 February to 30 April 2020 in Iraq. The study findings have revealed that there is a gradual increase of COVID-19 cases onwards until the top peak in 7th Apr. in which the cases reach 684, then decrease regularly. The total infected people of the study scope is 2085 persons according to the Ministry of Health in Iraq, while the world health organization (WHO) states 2003 person. The spatial distribution quantile map showed the hot spots in the province of Babylon, Maysan, and Diyala. However, less was found in three provinces (Nineveh, Salahaddin, and Al Anbar). The result shows that 66.9% recovered and 4.6% death cases out of total infected people. According to the procedures of Iraqi government, and many international reports that predict the end of this pandemic in the world will be doubtful as there is many vaccine under development.

Introduction

Since five decades, the emergence of many different coronaviruses that cause a wide variety of human and animal diseases has been existed. These viruses, which outbreak in a wide scope will continue to emerge, evolve and cause both human and other species[1]. Coronavirus disease (COVID-19) is an infectious disease newly discovered that has spread throughout the world[2]. According to the world health organization coronaviruses can infect birds and mammals, including humans and make up a large family of viruses[3].

Those coronaviruses such as (SARS-CoV-2) and (MERS) were outbreak in China, December 2019 and South Korea in 2015. The severe acute respiratory (SARS) pandemic, which were responsible for the numerous outbreaks around the world in 2002-2003[4].

Some coronaviruses cause devastating epidemics, others cause mild to moderate respiratory infections, like the common cold[5].

Most people don't require special treatment when infected with COVID-19 virus. However, the people with underlying medical problems develop serious illness such as diabetes, chronic respiratory disease, cardiovascular disease, and cancer[6].

Iraq has faced the spread of the COVID-19 virus with many problem and unstable situation for years such as the war against the islamic state, the politicals issue, and social crises that resulted in the protests of the last months of 2019. The whole world covered by the pandemic which led to the suspension of the lockdownas there are no specific vaccines or treatments for COVID-19. Therefore, it's important to

practice respiratory etiquette. WHO will continue to provide updated information for clinical trials evaluating potential treatments till vaccines become available[7].

Iraq's health system has faced many challenges, including the world's biggest mass displacement in 2014–2016 and internal conflict few years ago, all of these affected on the health system. The Government of Iraq faced the battle against the COVID-19 spreading with a few actual measures including boycott for the gathering places, lockdown, school closure, social distance, and implement mass quarantine to decrease the morbidity rate of COVID-19. Ministry of Health in Iraq take action especially for the COVID-19 patients, giving vital free clinical materials and setting up team committee for the COVID – 19 to check the people who has been infected with the virus and mandatory quarantine them then start carrying out human trial for coronavirus vaccine. Iraq authority late lockdown all the states, closure of borders and air terminals after coronavirus cases rise gradually as a feature of the measures to forestall the pandemic COVID-19.

Universities, schools, and cinemas in Baghdad were closed on 27 February, and the major religious gatherings during prayer were banned. However, the Kurdish Regional Government were took partial lockdown on religious gatherings on the 13th of March and severely applied on the 4th of April, after discovered the third of all cases in the Erbil city comes from 2 funeral gatherings on the 21 and 23 March. The aim of the research is to describe challenging of COVID-19 Pandemic in Iraq and the affect on Iraq economy. However Iraq government faced many problem except coronavirus. which is not the main problem of Iraq and spatial analysis was applied to determine the infected zone on Iraq map.

Case Report

Symptoms of Covid-19

Symptoms of COVID-19 can include fever, cough and shortness of breath. In more severe cases, infection can cause pneumonia or breathing difficulties. More rarely, the disease can be fatal[8]. These symptoms can develop into pneumonia, with chest tightness, chest pain, and shortness of breath followed by a dry cough, which requiring a hospital treatment.

The COVID-19 infection **rarely seems to cause a runny nose**, sneezing, or sore throat (these symptoms have been observed in only about 5% of patients). The **signs of a cold are stuffy nose, sore throat, and sneezing**. Symptoms of COVID-19 can vary from person to person. Symptoms may also vary in different age groups and people with existing chronic conditions seem to be more vulnerable to severe illness[9].

COVID-19 Transmission

The virus can pass between individuals through touching or shaking hands with a person who infected[10]. Therefore, most of the people during their lifetime may infected with coronaviruse. The virus could infected the people through touching their nose, or mouth after sharing the lifetime with the infected person. The virus also may spread through some animal coronaviruses, such as feline

coronavirus (FCoV). However, the highest risk of developing infection of COVID-19 in several groups of people include: People aged 65 years or older, women who are pregnant, young children[11].

Covid-19 Spread

There are important steps which help to reduce the spread of COVID-19 and protect yourself and those who are most at risk[12]. Two things required to reduce disease spread: **a) Masks** is the most effective way in public to reduce spreading of the virus, the ability of surgical masks helped to reduce the amount of flu virus shed through coughing or sneezing when worn by infected people. However, Public mask wearing is most effective at stopping spread of the virus when compliance is high. **The scientist found that surgical masks reduce coronavirus infection but not first line of defence**[13]. **b) limit contacts** of infected individuals. Slowing down the rate and number of new coronavirus infections is critical to reduce the risk that large numbers of critically ill patients cannot receive life-saving care. The following actions help prevent the spread of COVID-19, as well as other coronaviruses such as , good hygiene, social distancing, and public gatherings

Vaccine Against Covid-19

There are currently no vaccines against coronaviruses, including SARS-CoV-2. The development of vaccines takes long time around 18 months. Therefore, it is very important to prevent infection by implement mass quarantine with never before-seen measure[14]. Many scientists around the world are working on potential treatments and vaccines for the coronavirus. However, to determine its safety and efficacy before it use widely[15]. The scientists are working for an effective vaccine against the novel coronavirus, it may take 5 to 10 years. Many different vaccines for SARS-CoV-2 are under development and small number of them have reached the stage of development such as AstraZeneca's vaccine, Janssen's vaccine, Novavax's, and Pfizer-BioNTech vaccine.

Impact of Covid-19 on Diabetes and Blood Pressure Patients

COVID-19 is spreading rapidly around the world and must consider the impact on the patients with diabetes and blood pressure. Diabetes and blood pressure are common and facing a higher risk among other patients who die from COVID-19 because of alterations in the immune response. The older age and a more complex set of comorbidities such as diabetes and blood pressure compared with young patients effected by COVID-19 severity and death^[16]. Diabetes causes an increase in risk of thromboembolic events as it is tied to a prothrombotic state which led to increases coagulation activity by COVID-19 infection. That will lead to cause intravessel coagulation during an infection. Among COVID-19 patients, hypertension was the most common comorbidity which is accompanied by higher risk of infection and worse outcomes and prognosis. Hypertension and diabetes patients have significantly more pronounced endothelial damage, which is essential in pathogenesis of complications related to COVID-19. However, COVID-19 could also induce new onset of diabetes with metabolic complications and necessity for insulin therapy[17]. Therefore, life-threatening findings were more common in patients with hypertension and diabetes. *There are insufficient data to show if those patients with diabetes or hypertension are more*

likely to become infected with COVID-19; however, patients with diabetes have worse outcomes such as higher rates of serious complications according to the American Diabetes Association. The cytokine storm is more likely to occur in patients with diabetes because these patients at baseline carry a risk for low-grade chronic inflammation[18].

Pandemic Life Cycle Iraq

Covid-19 is not only a health and pharmaceutical problem. It is becoming an economic, political and civilization challenge that affects everybody, everywhere and for some time. It is important to understand the problem to advise the best possible decisions at personal, local, national and international level. Two main battles in Covid-19 conflict, foremost the health battle to control the epidemic dissemination at the national, regional and local level, to delay and lower the peak on infection looking at the evolving capacity of the health systems and the time to find treatments and vaccines. Then, the economic battle to recreate the economy not only to recover from the crises, but also to use the opportunity to create sustainable places and sites and over the world[19]. The world today naturally want to know when the COVID-19 pandemic will end. Estimating the quite dates has been unknown for the majority as it is important for the world health and economics. Its possible but not sure to predict the end date of COVID-19 based on the historical pandemic and also continually update the predictions as its evolves and generates more data which can make planning, proactive actions, decisions and mentality practice. Today the most reporting focuses on the acula cases of infection, recovery and death, which mailny lead to take action such as lockdown the city with many infection. Many reports estimate the ending date of pandemic life cycle, but is not so straight-forward and may be done differently for different considerations so based on those reports, the inflection point was detected in Iraq on 21-Apr-2020 and,there is no exact date of the end pandemic.

Methods

Date

The study undertook a descriptive analysis of the impact of Covid-19 in Iraq using data reported from the Ministry of Health in Iraq and the World Health Organization from the date 21 February to 30 April 2020 of the confirmed, deaths and recovered cases in Iraq. The prevalence of Covid-19 cases, fatalities attributed to Covid-19, and the case fatality rate for each of the 18 Iraqi governorates were accessed from the the Ministry of Health in Iraq and compared with the World Health Organization, and we additionally calculated Covid-19 incidence based on the infected, recovered and death cases per a day accroding to their population and governorate. The country-specific point prevalence and incidence of Covid-19 on case fatality associated deaths were tested to display their spatial distribution with geographic heat maps by the Global Moran's I along with Local indicator of Spatial Autocorrelation (LISA).

Iraq Economy Via Covid-19

while Iraq's economy is gradually recovering, after the contraction in 2019 due to the war against ISIS. The healthier of oil production, coupled with ongoing reconstruction efforts, rising domestic demand and improved security conditions led to grew of GDP to 4.4% . The COVID-19 pandemic was hitting Iraq. The outbreaks of the COVID-19 in Iraq destroyed the economic, GDP growth fall to -9.7% in 2020 in compare with 4.4% in 2019, according to the updated IMF forecasts on 14th April 2020, and expected to pick up 1.9 in 2021 [20].

The government admits at least 22.5% are below the poverty line [21]. Meanwhile, there is no government plan to support the people laid off due to the pandemic. However, government employees can depend on their steady salary while day laborers have been particularly hit hard as they rely on what they make day to day and often have no cushion of savings.

The combined effect of a lagging government response, woefully inadequate health care infrastructure, and developing financial crisis will lead to the huge risk from an outbreak that could kill many thousands in the coming weeks.

The world is facing a big challenge in responding to the pandemic, Iraq is a part from the world facing an extraordinary test of leadership in responding to save the economic and protect their people life from coronavirus with the currently situation the healthcare system should support from the U.S and other developing countries and should not be left alone to face the pandemic.

Iraq's economy is collapsing under the double blow of sinking oil prices and coronavirus lockdown. Lower oil prices and a weak healthcare systems will make Iraq's ability to respond to COVID-19 crisis more challenging. Iraq's economy was gradually recovered after the ISIS conflict and the civil war, GDP grew to 4.9% in 2019, but due to the coronavirus spread and the collapse in oil prices, the GDP fall to -4.4%, while it is expected to pick up to 1.9% in 2021. GDP growth remained positive in the 2015–2017 period by 2.5%. But overall growth is contracted in 2019, due to the reduction in oil production, to comply with OPEC+ agreement according to Iraqi authorities and World Bank staff estimates and projections (Table 2). GDP growth is highly dependent on performance of oil production and revenues.

Iraq's crude oil export prices crashed to 28.4 USD per barrel in March 2020, with companies announcing cutbacks in Iraq and the Kurdistan Region due to financial uncertainty.

The world bank state, Iraq will face extreme difficulties in financing basic expenditures planned at this price for 2020. Therefore, Baghdad must think and plan to grow its non-oil economy at a much faster pace. However, alternative sources of revenue are not faring much better.

Iraq's government was dealing with crises on multiple fronts even before the coronavirus outbreak. The violence was escalating between Iranian-backed militias and U.S. forces was. And the protests that started in October 2019 against the government then subsequent events linked to the COVID-19 pandemic in early 2020 have dampened economic activity . However, the lockdown measures lead to severe blow to economic activities which lead to drain the economy such as banking, trade, transport.

Results And Discussion

Early mobilization campaigns to distribute WHO COVID-19 educational materials have succeeded in raising public awareness and grasped the danger to protect general individual health. Chinese authorities identified a deadly new coronavirus strain, SARS-CoV-2 since (January 7, 2020); WHO declared a pandemic since five months (March 11, 2020). During this, Iraq government authority lockdown since six months (February 27, 2020).

Coronavirus COVID-19 hit the majority of the world, Iraq is one of those countries that has also been infected. As most of the infected countries, Iraq has reported its first confirmed case of SARS-CoV-2, infections on 22 Feb, 2020, and the infected was from Najaf. And then, more cases have been confirmed in all 18 Iraqi governorates, with the Kurdistan region, that reach 451 cases on 27 March. The total number of cases in Iraq till the date of Apr. 30, is 2085 confirmed cases. The rates of infection indicate a fast growth cases number were observed in the city of Baghdad 567 cases, Basra with 431 cases followed by Najaf with 303 cases due to the international airports and partial mass quarantine while a much lower infection rate cases number were in Salahaddin 4 cases and Al-Anbar 2 cases due to the closure of the essential, non-essential sectors and mandatory quarantine. The details of the cases are registered in various cities are plotted in Figure 1 and the result is analyzed using descriptive statistics to present data obtained that are confirmed by the Ministry of Health in Iraq and the world health organization as well.

Apart from the total number of infected persons which reach to 2085 on 30 April, tens of thousands of people in Iraq are quarantined at home or in hospitals and the government established quarantined centres. Some reports state, there may be a number of people already infected, but could not be recorded yet because of the slow pace of testing in the country. Until now (30th April 2020) only 92061 coronavirus tests were conducted according to the Ministry of Health in Iraq which is counted among the lowest in the world. In addition to that, 1375 patients have been recovered from the COVID-19, and 96 patients died which represents 4.6% of the registered cases. This recover cases represent 66.9% of the registered cases while the remaining are under the treatment. (Figure 2).

The total morbidity rate is lower in Iraq as compared with the western countries as the rate of mortality in the registered cases is quite high. According to the Jordanian society published a part of a study under investigation, which explains the resistance of the Arab bodies to coronavirus, unlike Western countries, in which it states the Arabs of the middle east possess genetics SNPS in their bodies which easily fight the virus.

The number of cases that are registered during the months of February, March, and April are shown in Figure 3 and Table 1. As seen from this figure, the number of COVID-19 cases increased slightly started from 22 Feb with a case, then reach to 684 cases in Apr. 07. 2020 which is the highest peak registered in Iraq. After the Apr. 07, the infected people were slightly decreased but it still high compared to March due to the decrease in preventive security measures and partial lockdown.

The infection keeps increasing in Iraq but it is less than a western country and other Arab countries which is due to easing the lockdown and reopening the essential sectors. According to some reports, the covid-19 spread in Iraq through Iran and neighboring countries but Iran has the biggest concentration of the disease and the highest concentration of deaths per resident. Therefore, the Iraq government had decided to close its borders with Iran in late February which is too late, only allowing Iraqi citizens that were returning after the pandemic has been spread where some of them were infected with the coronavirus. Until WHO declared the disease as pandemic on 11th March.

Iraq banned travels from Germany and Qatar on March.13, while the passengers from China, France, Iran, Italy, Japan, Singapore, Spain, South Korea, and Thailand also were on the ban list on 15 March, in an attempt to stop the disease.

The government announced that all flights to and from Baghdad and Najaf airport between 17 and 24 March would be suspended. Then a curfew was imposed in the capital, Baghdad, over the same period.

Table 1. COVID–19 outbreak according to Ministry of Health and world health organization in Iraq

| Region | Total Cases | Recovered | Death | Population/2017 |
|--|-------------|-------------|-----------|-------------------|
| Baghdad | 567 | 332 | 40 | 8.318.696 |
| Najaf | 303 | 271 | 6 | 1.500.522 |
| Basra | 431 | 187 | 17 | 2.972.162 |
| Erbil | 198 | 162 | 1 | 1.896.753 |
| Sulaymaniyah | 161 | 141 | 4 | 2.212.099 |
| Karbala | 86 | 80 | 6 | 1.241.273 |
| Dhi Qar | 65 | 50 | 3 | 2.132.149 |
| Al-Muthanna | 82 | 33 | 3 | 824.831 |
| Wasit | 35 | 28 | 2 | 1.401.442 |
| Kirkuk | 40 | 26 | 2 | 1.629.625 |
| Diyala | 14 | 15 | 4 | 1.660.007 |
| Babylon | 45 | 9 | 5 | 2.093.416 |
| Duhok | 18 | 15 | 0 | 1.318.458 |
| Al-Qadisiyyah | 12 | 10 | 1 | 1.311.699 |
| Maysan | 14 | 7 | 2 | 1.134.968 |
| Nineveh | 6 | 6 | 0 | 3.793.982 |
| Salahaddin | 4 | 1 | 0 | 1.615.924 |
| Al-Anbar | 2 | 2 | 0 | 1.796.557 |
| Total Number of confirmed cases | 2085 | 1375 | 96 | 38.854.563 |

Analysis of Emerging Spatial and Temporal Hot Spots

The spatial distribution quantile map has been prepared to represent hot spots. Besides, to understand the spatial pattern and cluster of case fatality in Iraq spatial autocorrelation statistics have been used. In this context, Global Moran's I along with Local indicator of Spatial Autocorrelation (LISA) statistics have been tested on case fatality. The global Moran's I value reveals that weather there is a spatial dependency of the pattern and cluster of case fatality in the country. It can be express by the following:

$$I = \frac{N \sum_{i=1}^n \sum_{j=1}^n W_{ij} (X_i - \bar{X}) (X_j - \bar{X})}{\left(\sum_{i=1}^n \sum_{j=1}^n W_{ij} \right) \sum_{i=1}^n (X_i - \bar{X})^2} \text{Equation,} \quad (1)$$

N= No of Provinces X_i = case fatality value of a province

\bar{X} = Mean of the case fatality rate

w_{ij} = Weight indexing province i relative to province j

X_j = Case fatality value in another provinces.

In this context, LISA statistics has been applied to identify the spatial pattern of case fatality in different provinces of the country. Local Indicator of Spatial Autocorrelation (LISA) which is also called Local Moran's I Index, can be represented by following:

$$I_i = \frac{(X_i - \bar{X})}{S^2_i} \sum_{j=1, j \neq i}^n W_{ij} (X_j - \bar{X})^2 \text{Equation,} \quad (2)$$

X_i = CF value for the i^{th} province,

\bar{X} = Mean of the CF

w_{ij} = spatial weight between province i and j

n = total number of observations and,

$$S^2_i = \frac{\sum_{j=1, j \neq i}^n W_{ij} (X_j - \bar{X})^2}{n-1}$$

Conditional map has also been prepared based on COVID-19 prevalence and case fatality rate among different regions of Iraq. The maps have been prepared with the help of GeoDa software.

Analysis:

The prevalence rate is found to be comparatively higher in the province of Babylon, Maysan, and Diyala (Fig 4. a), and less in four provinces (Duhok, Nineveh, Salahaddin, Al Anbar) situated at the western part of the country. Global Moran's I statistics have been represented by scatterplot (Fig 4. b) Moran's I value (0.129) with the significance level (P-value = < 0.05) shows a positive spatial dependency of case fatality pattern in Iraq. In this LISA cluster map one type of significant spatial autocorrelation (Low-low) and one type of significant spatial outlier (Low-high) has been found in the study area (Fig 4.c). Province of Dohuk, Nineveh, and Erbil significantly represents a low case fatality rate (cold spot) with low spatial autocorrelation whereas the province of Wasit exposed with low case fatality rate with high negative spatial autocorrelation. LISA significant map (Fig 4.d) Shows the significance level of the spatial

clustering among the provinces of Iraq in terms of case fatality rate. Out of 18 provinces, three showed the highest outbreak in the case confirmed, death and recovered are (Baghdad, Najaf, Basra) which represent 32.9% of the Iraq population.

Conditional Map shows the changes in the case fatality rate along with the increase of prevalence rate among different provinces of the country. The provinces of the extreme western part shows a relatively very low prevalence rate with low case fatality. Diyala and Maysan epode with a low prevalence rate but high case fatality, which indicates the poor management of the health system over the last 15 years. However, Iraq's healthcare system is in crisis ith the high number of patients . There's a shortage of drugs and the medical staff to administer them. Despite facing a very high prevalence rate the case fatality is very low in Al-Najaf. Only Bagdad is facing with high prevalence rate with high case fatality due to the high population rate and the presence of the international airport.

Conclusion

This pandemic comes not to be terminated, but to continue and strengthens in each phase, unlike the other viruses. It affects the respiratory system of the human and can hide in many positions within the human body to protect itself from the new vaccines. Protection of human lives which outcome will influence the economic recovery and trust is the challenge of the world against the virus.

COVID-19 in Iraq comes to be limited via the procedures that have been undertaken by the government as the ban and curfew may be enough to avoid a sharp increase in the number of infected cases and death. Unfortunately, some groups did not consider these procedures by congregation visiting shrines which lead to spread. Accordingly, the government becomes stricter for all kinds of gathering people. It reveals that the number of COVID-19 cases in Iraq rises slowly followed by a gradual number of recovered cases and few numbers of death cases during 70 days from 21 Feb to 30 April 2020. It is considered that the virus still under control in Iraq as some reports state that, the number of infected people will be increased with the partial lock-down. However, COVID-19 will able to be decrease community transmission with shelter-in-place orders, mandatory masks, and social distancing measures that would reduce the risk of the increased patients.

Declarations

Competing interests

The author has no conflict of interest to report. I declare that I have no significant competing financial, professional, or personal interests that might have influenced the performance or presentation of the work described in this manuscript.

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Figures

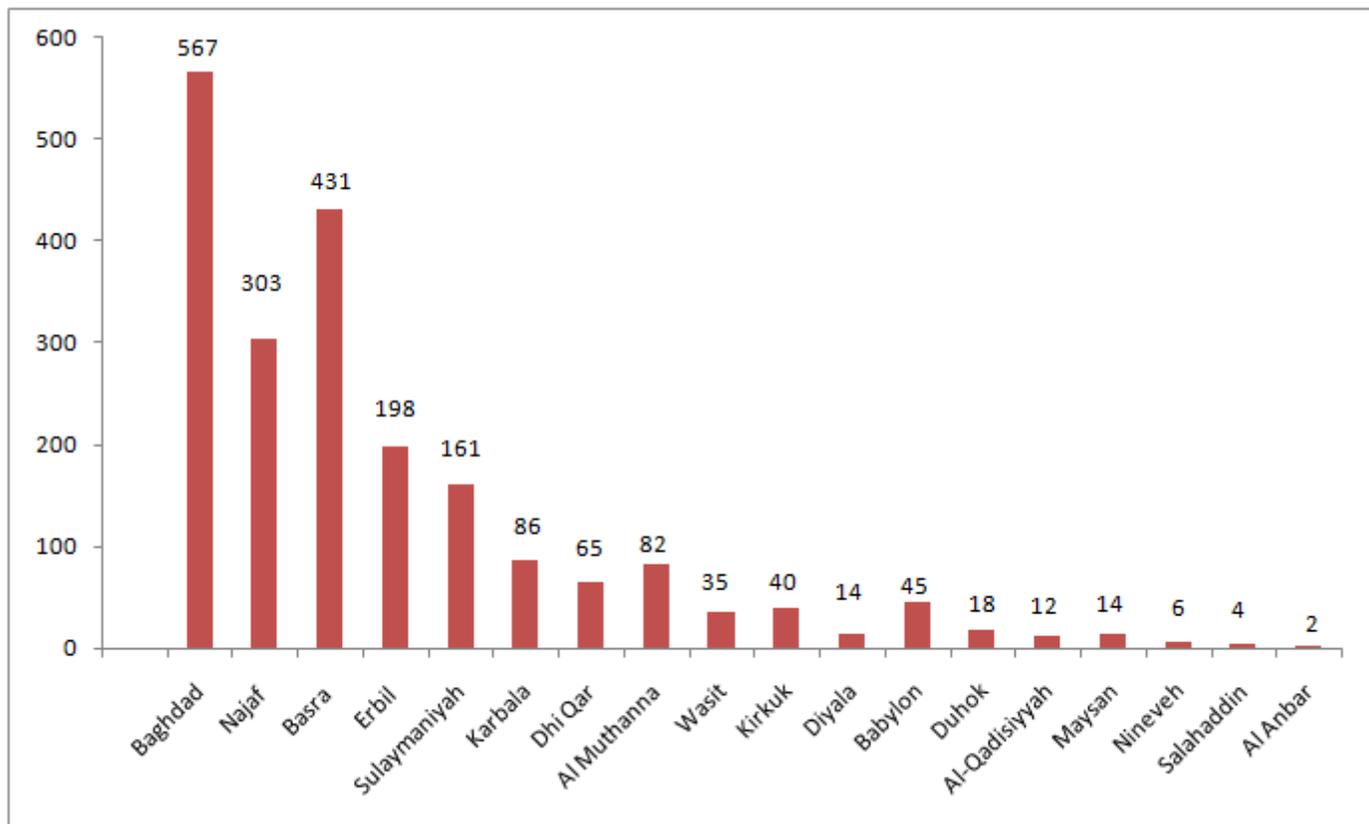
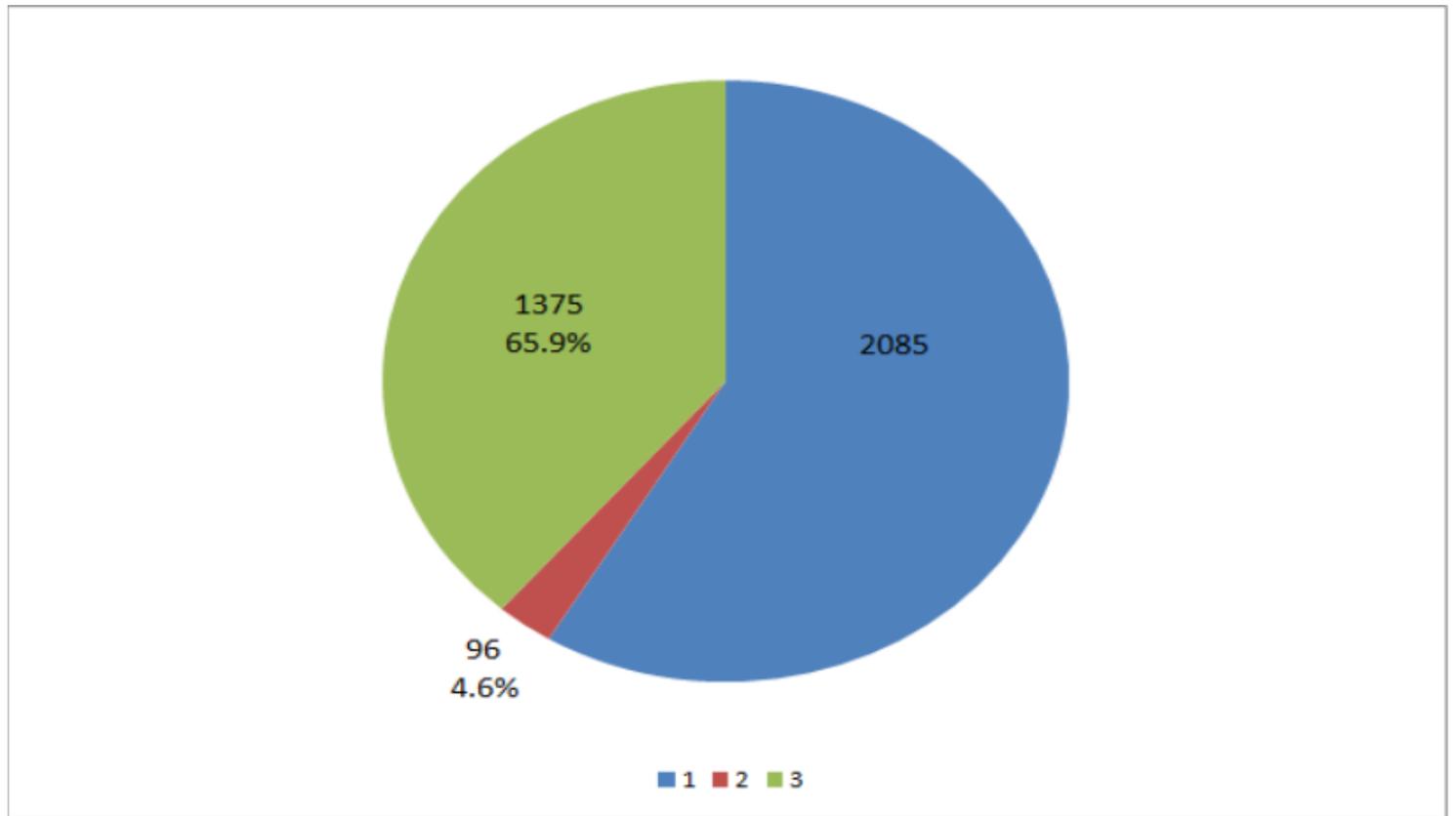


Figure 1

Number of COVID-19 cases in Iraq



■ Total Number of Covid-19 Cases ■ Total Number of Covid -19 Recovered
■ Total Number of Covid- 19 Death

Figure 2

Total number of COVID-19 cases

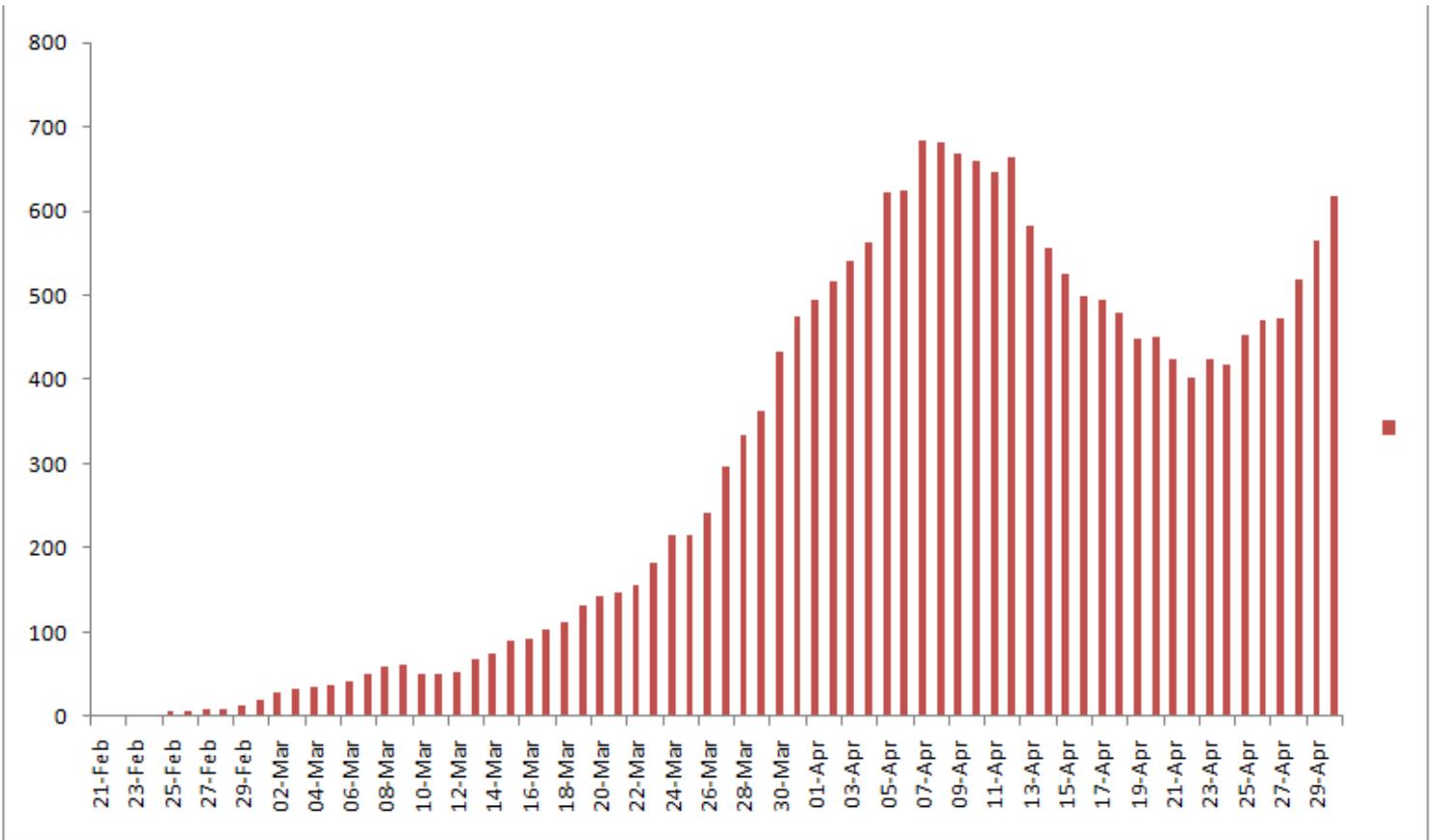


Figure 3

Daily report of COVID-19 cases in Iraq

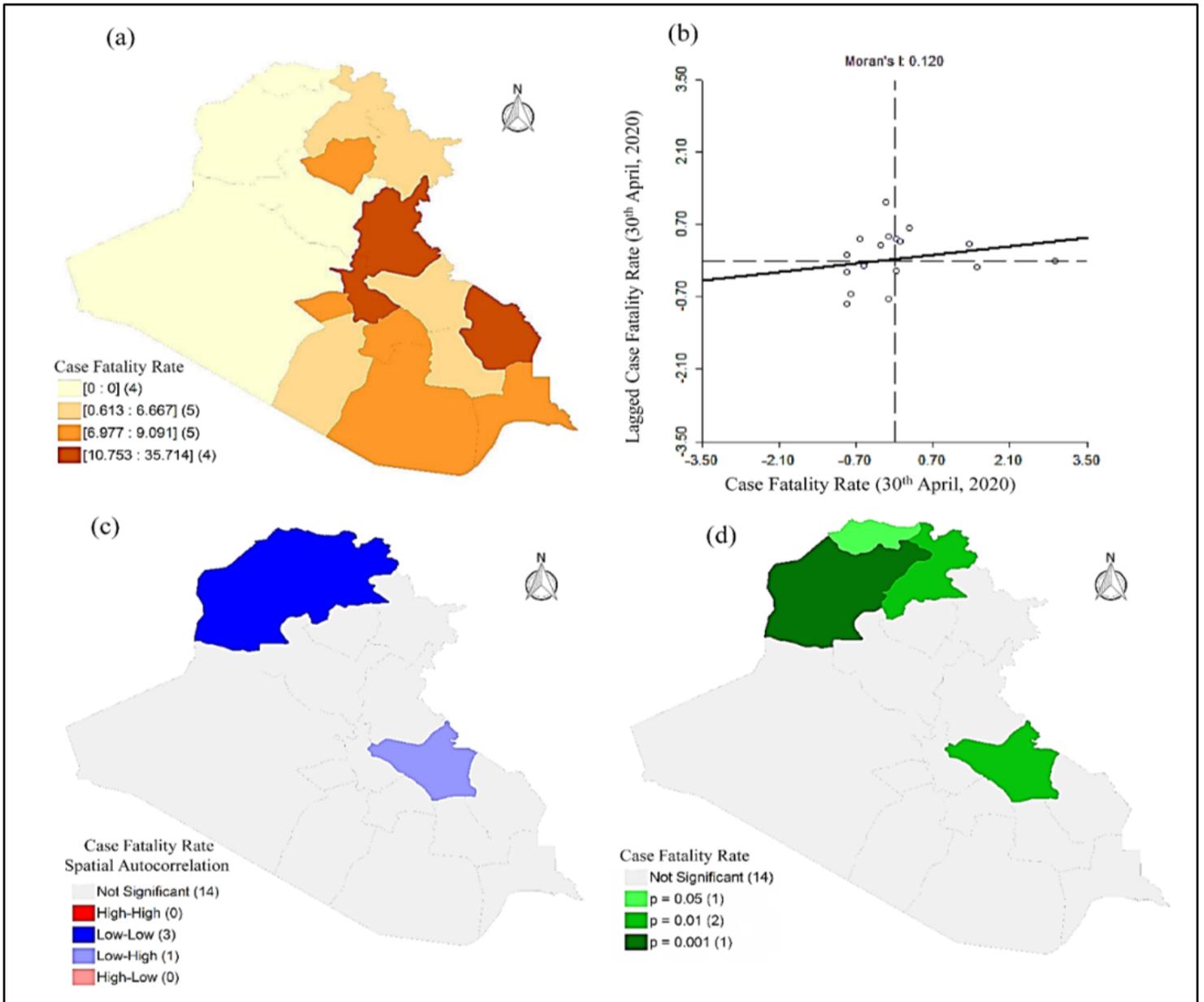


Figure 4

Spatial distribution and cluster of COVID-19 case fatality rate by 30 April, 2020 in Iraq. (a) Quantile map shows the distribution of cumulative closed case fatality in different regions of Iraq. (b) Moran's Scatter Plot of closed case fatality rate of COVID-19 on 30th April, 2020 (c) LISA cluster map of case fatality rate, dark and light blue colour shows the spatial cluster of low and high case fatality rate with positive and negative spatial autocorrelation respectively.(d) LISA Significance map of spatial Cluster.

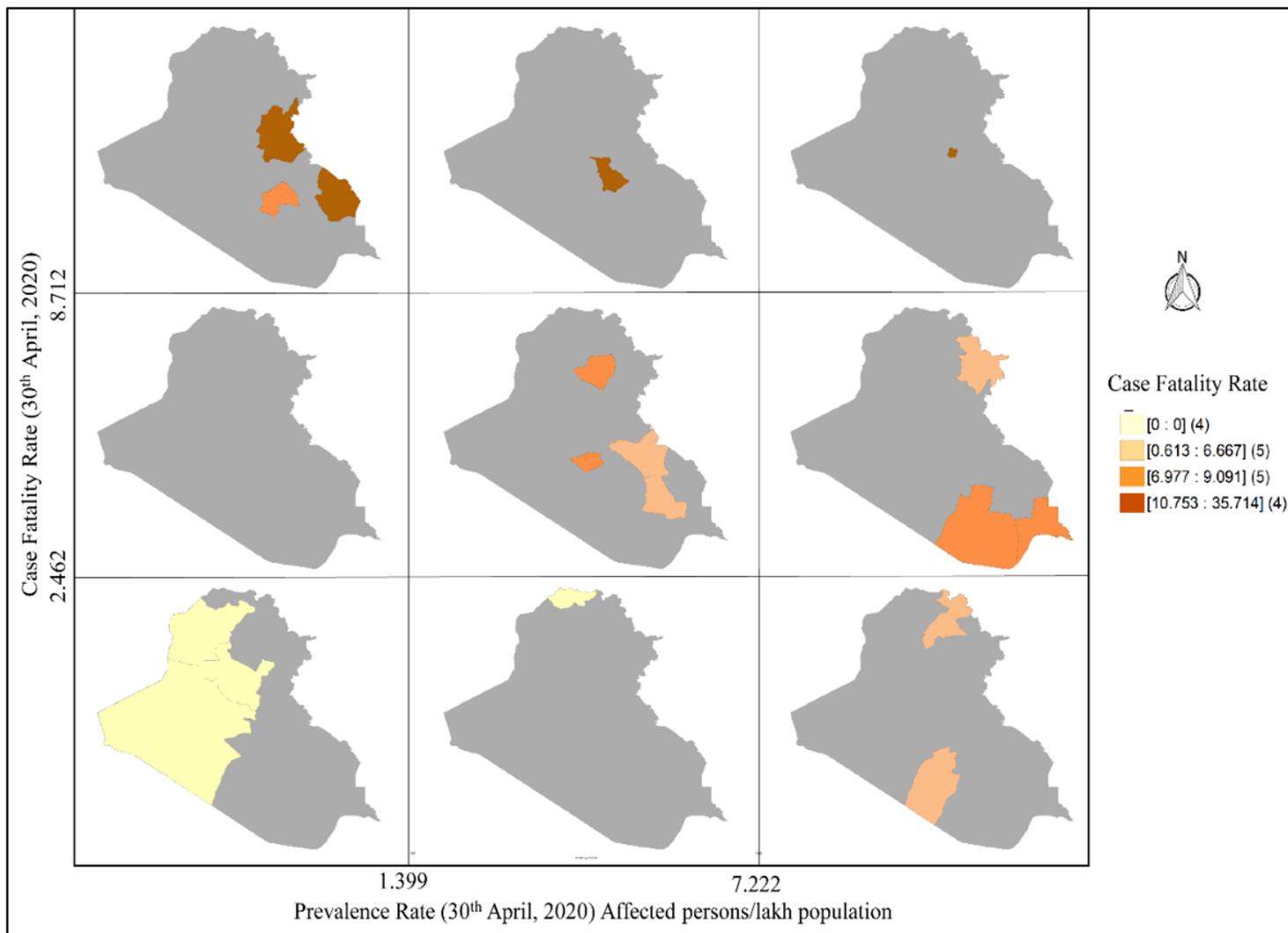


Figure 5

Regional distribution of case fatality rate in association with disease prevalence rate on 30th April, 2020 in Iraq.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [InfectionandDeathperdayandRegioninIraq.xlsx](#)