Coronavirus Disease-19: Outbreaks In Iraq

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ABSTRACT

Coronavirus is a new pandemic disease which has emerged in Wuhan, China, and then spreads around the world. The cases number of the COVID-19, that have been daily reported in Iraq, has risen slowly. However, no confirmed study has been undertaken to evaluate the situation of the COVID-19 concerning the confirmed cases, deaths 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 till 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 person 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 province (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 reports that predict the end of this pandemic will be in June, yet they are doubtful as there is no vaccine.

KEYWORDS

Iraq, Covid-19, Pandemic, Confirmed Cases.

1. 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 organisation coronaviruses can infect birds and mammals, including humans and make up a large family of viruses[3].
Recently coronavirus (SARS-CoV-2, also known COVID-19) sparking international concern outbreak in China, December 2019.
Those viruses (MERS) were outbreak in South Korea in 2015 and the severe acute respiratory (SARS) pandemic of 2002-2003[4], which are responsible for the numerous outbreaks around the world. Some coronaviruses have caused devastating epidemics, others cause mild to moderate respiratory infections, like the common cold[5]. Most people infected with the COVID-19 virus recovered without

requiring special treatment while those with underlying medical problems develop serious illness sich as diabetes, chronic respiratory disease, cardiovascular disease, and cancer[6].

The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette[6]. At this time, there are no specific vaccines or treatments for COVID-19. Therefor, 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 actule measures including boycott for the gathering places, lockdown, school closure, social distance, and implement mass quarantine to decrease the morbidity rate of COVID-19. Minstry of heath 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 peole who has been infected with the virus and mandatiry 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.

On 27 February, schools, universities and cinemas in Baghdad were closed, and other large public gatherings including events and major religious gatherings during prayer were banned until 7 March. On the 13th of March, partial lockdown were took on religious gatherings in the Kurdish Regional Government, but were enforced strictly in the 4th of April, when it was discovered that 2 funeral gatherings on the 21 and 23 March were responsible for a third of all cases in the city of Erbil. The aim of the study is to deecrible the challenging between Iraq government with COVID-19 Pandemic and spatial distribution quantile map was used. However Iraq governemt faced many problem except coronavirus. which is not the main problem of Iraq and spatial analysis was used along wi

2. Symptoms of Covid-19

COVID-19 generally causes a fever and cough which may appear after exposure to the virus in some patients between 2-14 days particularly the elderly and others with other chronic health conditions[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). Sore throat, sneezing, and stuffy nose are most often signs of a cold. More serious cases develop severe pneumonia, acute respiratory distress syndrome, sepsis and septic shock that can lead to the death of the patient. People with existing chronic conditions seem to be more vulnerable to severe illness[9].

3. COVID-19 Transmission

Most people will infect in coronaviruses during their lifetime. The virus can pass between individuals through touching or shaking hands with a person who infected[10]. Coughing and sneezing without covering the mouth can disperse droplets into the air as well making contact with a surface or object that has the virus and then touching the nose, eyes, or mouth. The virus also may spread through some

animal coronaviruses, such as feline coronavirus (FCoV). However, it is unclear whether this also applies to human coronaviruses. Several groups of people have the highest risk of of developing intricacy due to COVID-19[11].

- Young children.
- People aged 65 years or older.
- Women who are pregnant.

3.1. How To Protect Yourself From Covid-19

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)** wearing masks in public to reduce the transmission probability. **b)** limit contacts of infected individuals via physical distancing and contact tracing with appropriate quarantine, and second among other measures.

3.1.1. Slow the Spread

COVID-19 is spread mainly through person-to-person contact**.** Staying home and avoiding close contact with others outside of your household is the best way to stop spreading the virus.

a. GoodHygiene
Good hygiene are generally considered include bathing regularly or showering, washing hands regularly and especially before handling food, washing scalp hair, keeping hair short or removing hair, wearing clean clothing, brushing teeth, cutting finger nails, besides other practices.

b. Social Distancing
The most effective way to slow the spread of COVID-19 is the social distancing according to the World Health Organization. You may practise social distancing in public, at home, at work, and in schools.

c. Public Gatherings
Large events and mass gatherings can contribute to the spread of COVID-19, via travelers who attend these events and introduce the virus to new communities.

d. Self-isolation
Means you must stay at home for 14 days. You must self-isolate if you have COVID-19, or you have been in close contact with a confirmed case of COVID-19.

3.1.2. Surgical Masks

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]. The ability of surgical masks helped to reduce the amount of flu virus shed through coughing or sneezing when worn by infected people.

4. 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. Therefor, 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 as any vaccine produce, it needs to undergo extensive testing to determine its safety and efficacy before it use widely[15]. Many vaccine

candidates under design or preclinical development for COVID-19 in 2020, some of them have heterologous effects, also called non-specific effects. That means they can have benefits beyond the disease they prevent while the other will not gain approval for human studies due to toxicity, ineffectiveness to induce immune responses or dosing failures in laboratory animals, or because of underfunding.

5. 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[16]. The world today naturally want to know when the COVID-19 pandemic will end. Estimating the quite dates has been unkown for the majority as it is important for the world health and econmics. 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 mocst reporting focuses on the acula cases of infection, recovery and death, which mailny lead to take action such as lookdawn 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 the expected to end 99% of the pandemic in August-2020[17].

6. Iraq Economy Via Covid-19

The COVID-19 pandemic is hitting Iraq at a particularly bad time. Iraq's economy is gradually rebounding, after the contraction in the last year due to the war against ISIS. GDP grew to 4.4% in 2019, on the back of a healthier oil production, coupled with ongoing reconstruction efforts, rising domestic demand and improved security conditions. According to the updated IMF forecasts from 14th April 2020, due to the outbreak of the COVID-19, GDP growth fall to -9.7% in 2020 and expected to pick up 1.9 in 2021[18].

Iraq's health sector appears to be among the least prepared to deal with a pandemic that is challenging much more robust health care systems in the world's developed countries. The sector suffers from decades of under investment, war damage, poor management, corruption, and emigration of doctors.

The government admits at least 22.5% are below the poverty line[19]. 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 developing financial crisis, woefully inadequate health care infrastructure, lagging government response and poor information and community response place the country at huge risk from an outbreak that could kill many thousands in the coming weeks.

The world is facing a big challange 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 peole life

from coronavirus with the currently situation the healthcare syetem should support from the U.S and other developing conturies and should not be left alone to face the pandemic. Every effort made today can help buy time and save lives. However, even with the best leadership and under the best of circumstances, these governments will need help from the U.S. and international community[20].

7. 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.

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 19 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.
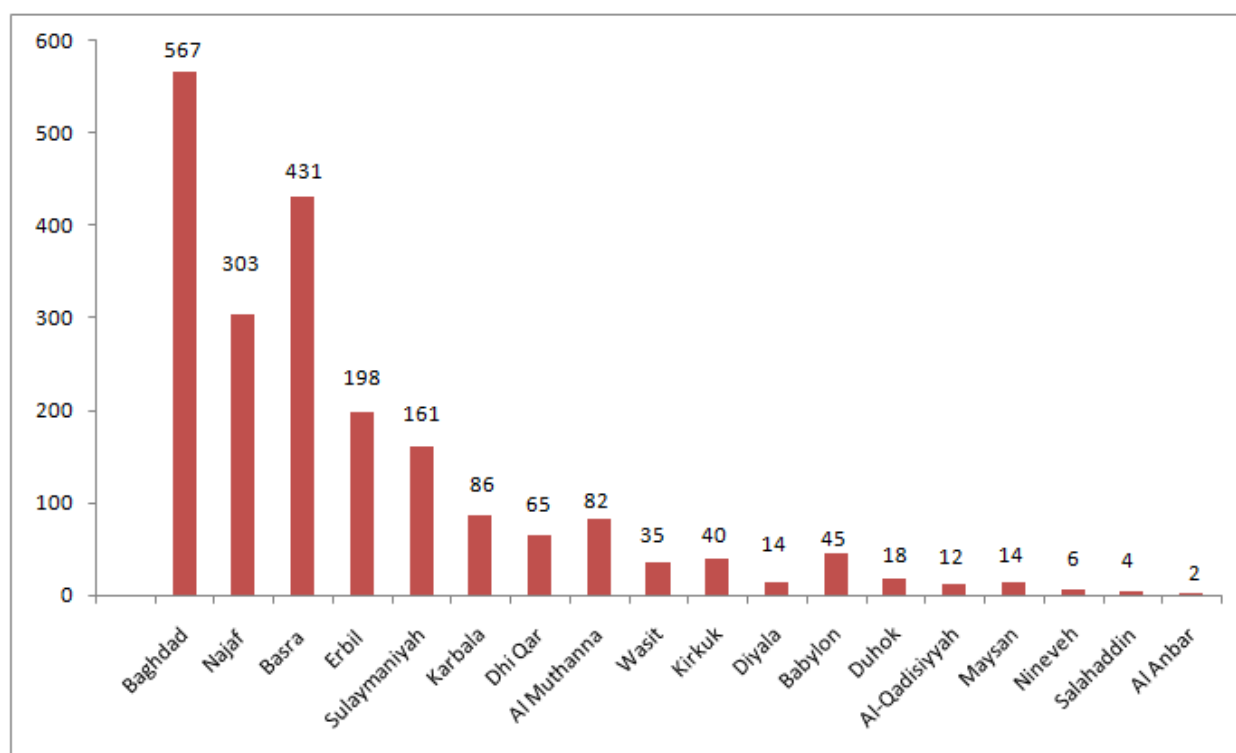

Figure 1. Number of COVID-19 cases in Iraq

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.
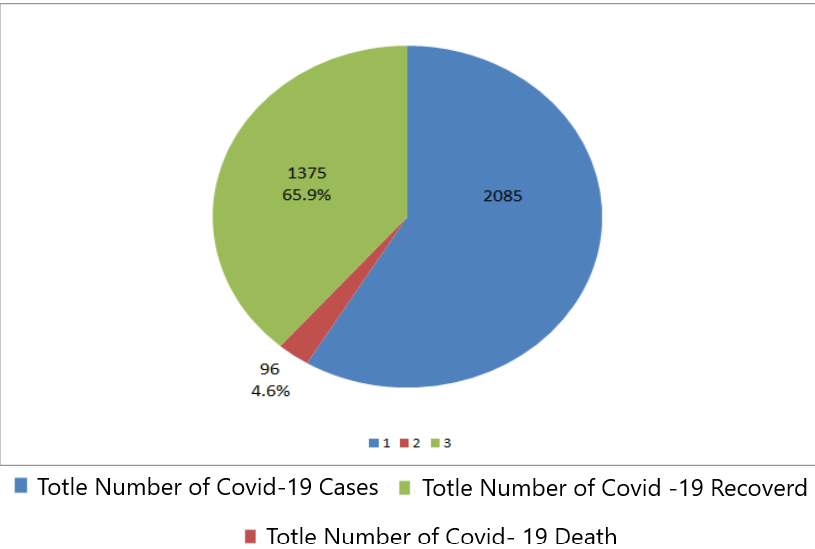

Figure 2. Total number of COVID-19 cases

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.
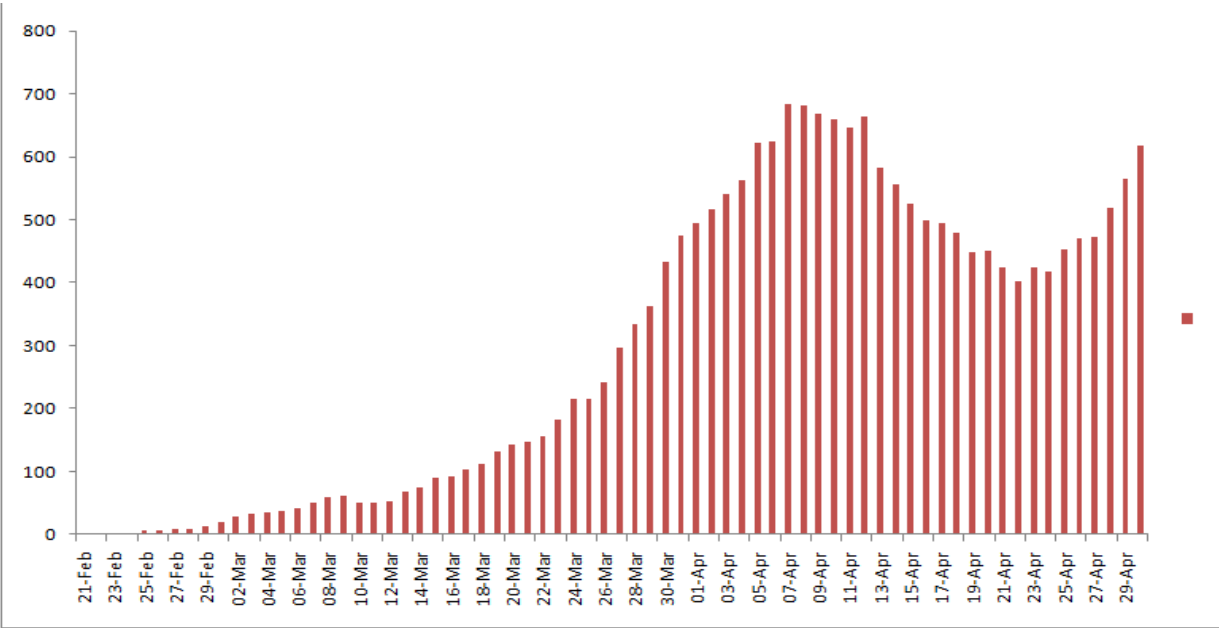

Figure 3. Daily report of COVID-19 cases in Iraq

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 Confirmed 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**

Iraq's economy is collapsing under the double blow of sinking oil prices and coronavirus lockdown. Iraq could also be faced with a trade-off of issuing more domestic debt or drawing down external buffers at the risk of affecting domestic liquidity and reduce investor confidence If oil prices decline further which, particularly if combined with further delays in fiscal adjustment. This situation could also entail pressures on the exchange rate peg, sovereign rating downgrades, higher financing costs, and thereby hindering growth prospects. 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 pike up to 1.9% in 2021, 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. Because of increased oil production and exports, overall 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.

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[21].

TABLE 2. Economic Growth and Prices in Iraq

	2017	2018	2019	2020	2021
Real GDP (percentage change)	2.5	0.6	4.4	- 9.7	1.9
Non-oil real GDP (percentage)	0.6	1.2	4.9	- 4.4	5.5
GDP per capita (US$)	5.058	5.641	5.841	4.282	4.858
GDP (in ID trillion)	231.0	565.0	276.7	202.4	229.7
Non-oil GDP (in ID trillion)	144.3	180.5	156.3	151.0	161.7
GDP (in US$ billion)	195.5	224.2	234.1	171.3	194.3
Oil production (mbpd)	4.46	4.61	4.84	4.03	4.02
Oil exports (mbpd)	3.33	3.50	3.54	2.84	2.78
Iraq oil export prices (US$ pb)	49.1	65.5	61.1	30.0	39.8
Consumer price inflation (percentage change, average)	0.2	0.4	- 0.2	1.3	2.0

Even before the coronavirus outbreak, Iraq's government was dealing with crises on multiple fronts. Violence between Iranian-backed militias and U.S. forces was escalating. Islamic State militants were attempting a comeback. 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 which lead to drain the economy.

As in 2014, the fall in oil prices poses serious threats to Iraq's oil-dependent economy, but the current storm hits a very different Iraq from that of 2014, especially changed this time is Iraq's equity market. Then, the equity market was at the end of a multi-year bull market that, as the Rabee Securities RSISX USD Index (RSISUSD), had almost doubled by early 2014 from the levels of 2010. Comparatively, now the Iraq equity market is at the end of a multi-year bear market that saw it decline 71% from the 2014 peak. Fuelling the 2014 bull market were foreign investor inflows and the government's multi-year

investment spending program which boosted the economy and domestic liquidity. The opposite is true in the current bear market with most foreigners having withdrawn from the market and the government's investment spending having been practically non-existent for a number of years.

The lockdown measures needed to contain the pandemic have dealt a severe blow to economic activities especially the services sectors like transport, trade, banking, and religious tourism, which constitute around half of the non-oil economy. The growing discontent over poor service delivery, rising corruption, and lack of jobs persists and is coupled with the political impasse over the formation of a new government.
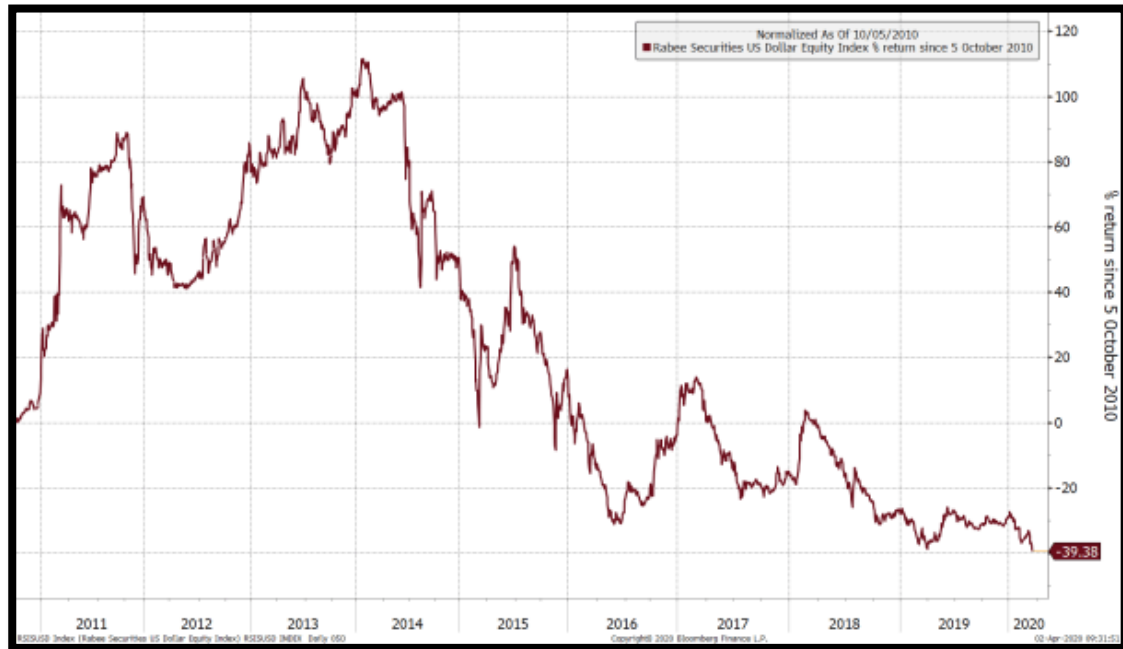

Figure 4. RSISUSD Index: Iraq Market 2010–2020 **(**Source: Bloomberg**)**

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:

$$I = \frac{N \sum_{i=1}^{n} \sum_{j=1}^{n} Wij \ (Xi-X) \ (Xj - \bar{X})}{\left(\sum_{i=1}^{n} \sum_{j=1}^{n} Wij\right) \sum_{i=1}^{n} (Xi - \bar{X})2} \qquad \text{Equation,} \qquad (1)$$

N= No of Provinces Xi= case fatality value of a province
X= Mean of the case fatality rate
wij= Weight indexing provincei relative to province j
Xj= 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:

$$Ii = \frac{(X_i - \bar{X})}{S^2 i} \sum_{j=1, j\neq i}^{n} Wij \, (Xj - \bar{X})^2 \qquad \text{Equation,} \qquad (2)$$

X_i = CF value for the ith province,

X= Mean of the CF

wij= spatial weight between province i and j

n = total number of observations and, $S^2 i = \dfrac{\sum_{j=1, j\neq i}^{n} Wij(Xj - \bar{X})^2}{n-1}$

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'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.
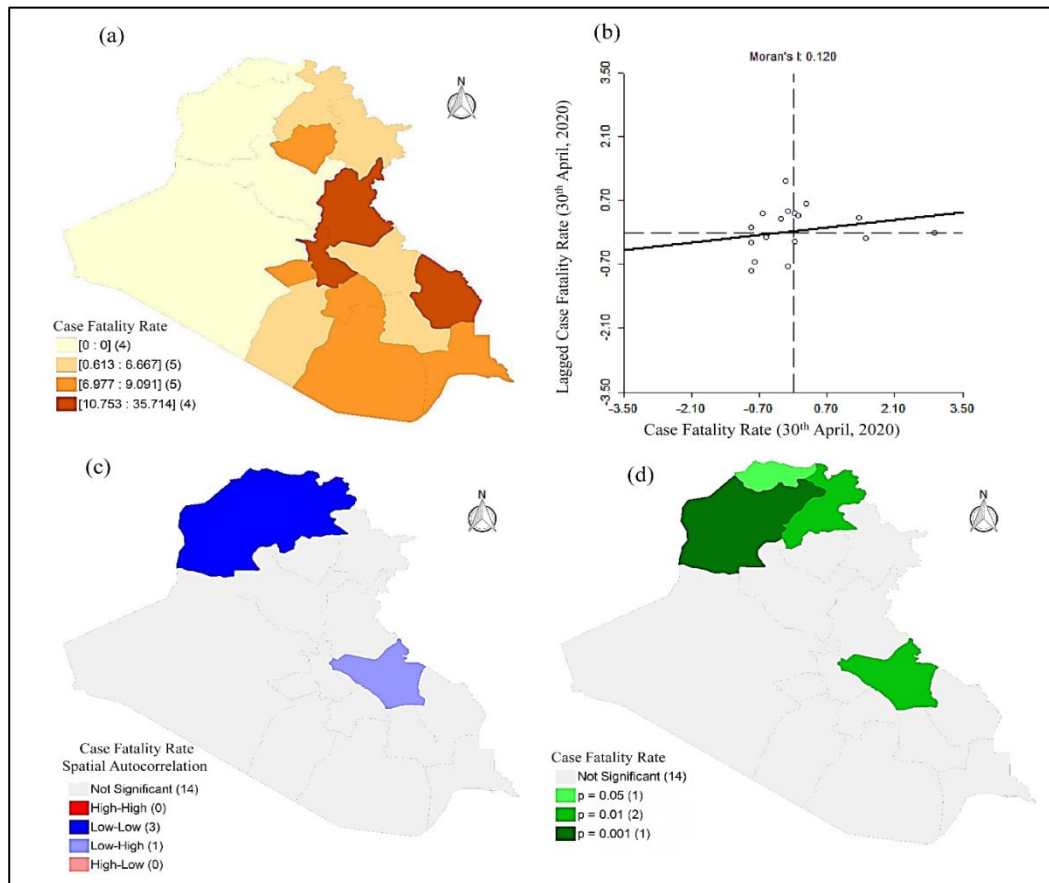
Figure 5. Spatial distribution and cluster of COVID-19 case fatality rate by 30 April, 2020 in Iraq. (a) Quantile map shows the distribution of cumulative closed case fatality in different regions of Iraq. (b) Moran's Scatter Plot of closed case fatality rate of COVID-19 on 30th April, 2020 (c) LISA 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.

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. 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.
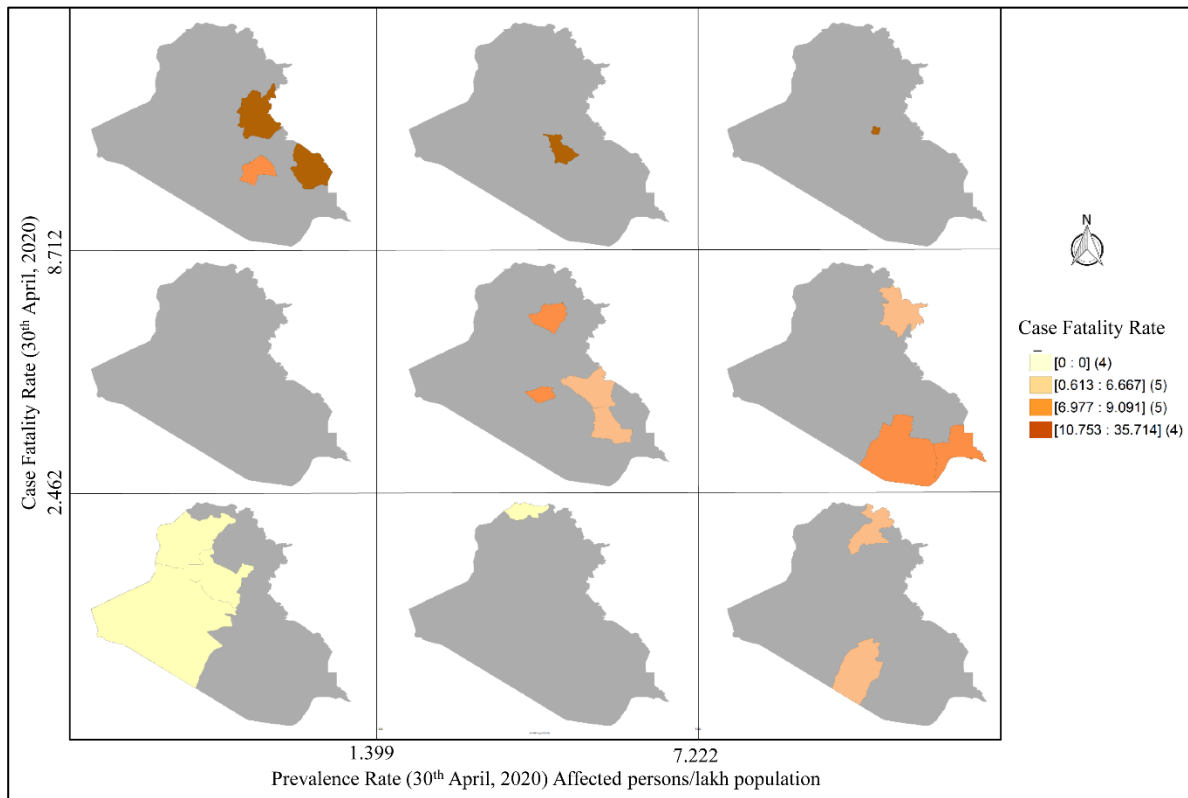
Figure 6. Regional distribution of case fatality rate in association with disease prevalence rate on 30th April, 2020 in Iraq.

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 the end of the virus totally will be in August 2020.

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