EPIDEMIOLOGY OF COVID-19 IN FOUR MAJOR GOVERNORATES IN IRAQ

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ABSTRACT

Introduction: The latest pandemic is COVID-19 as it has been declared by the World Health Organization on March 11,2020. It has a zoonotic source but it continues infecting human. **Aim:** The current study is aiming for displaying epidemiology of COVID-19 in four major Governorates in Iraq. **Method and subjects:** A prospective cohort study design was adopted to analyze the epidemiological data that is published officially by the Public Health Department in Iraqi Ministry of Health from February 24 to the end of July 2020. Four major Iraqi Governorates were included in the current study; Nineveh, Erbil, Baghdad and Basra. Inclusion criteria was "infected patients with COVID-19 that confirmed by polymerase chain reaction testing. **Results:** Baghdad was the first one that reported a confirmed COVID-19 infection among the four studied Iraqi Governorates. Incidence in Iraq was 312 per 100,000 population. The highest incidence was in Baghdad and Al-Basra Governorates (494 and 331 per 100,000 population). Case fatality rate was 3.8%; almost third of deaths in Iraq (35.2%) was in Baghdad. **Recommendations:** The current study recommends that clinical and radiological presentation should be considered in COVID-19 case-confirmation.

KEYWARDS: Epidemiology, COVID-19, Incidence, CFR, Nineveh, Baghdad, Erbil, Al-Basra.

INTRODUCTION

The World Health Organization (WHO) has declared COVID-19, the infectious disease caused by the most recently discovered coronavirus, as the latest pandemic on March 11,2020; only three months after its outbreak in Wuhan, China, in December 2019.[1] Although COVID-19 has a zoonotic source, as all available evidence suggests, it continues infecting human.[2]

The infection is caused by the novel coronavirus that named "SARS-CoV-2". It shows less severe pathogenicity bit higher transmission competence (as is evident from the continuously increasing number of confirmed cases globally) than the other previously knowncoronaviruses as Ebola virus, avian H7N9, SARS-CoV, or MERS-CoV.[3]

The COVID-19 is transmitted by close contact (about 6 feet or two arm lengths) with an infected person or with his respiratory droplets during coughing, sneezing or talking; and by touching mouth, nose, or eyes after touching a surface or object that has the virus on it. A wide range of symptoms are being showed on people with COVID-19, ranging from mild symptoms to severe illness, 2-14 days after exposure to the virus. The reported symptoms may have included fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea or vomiting and diarrhea. Generally, older adults and people with severe underlying medical problems as diabetes, cardiac or lung disease seem to be at higher risk for developing more serious complications.[1]

The current study is aiming for showing epidemiology of COVID-19 in four major Governorates in Iraq.

METHOD AND SUBJECTS

In order to achieve aim of the current study, a prospective cohort study design was adopted to analyze the epidemiological data that is published officially by the Public Health Department in Iraqi Ministry of Health every day.[4] The required data were collected from February 24, 2020 , the time when first case of COVID-19 had been confirmed in Iraq, to the end of July 2020. Four major Iraqi Governorates were included in the current study; Nineveh, Erbil, Baghdad and Basra.

Incidence of COVID-19 was estimated in the current study according to its definition (number of NEW cases during a given period among population at risk during that period).[5] Inclusion criteria of cases was precisely determined as " infected patients with COVID-19 who laboratory confirmed by polymerase chain reaction (PCR) testing in samples of the upper respiratory tract (upper nasal and/or oropharyngeal swabs). Patients whose PCR was positive was included within studied cases. Cases who were diagnosed clinically or on radiological base but showed negative PCR were excluded from study. Population of Iraq and of each governorates was derived from 2018 census results and latest official estimates and projections that were published by the Report of Central Statistical Organization in Iraqi Ministry of Planning.[6]

Epidemiology of COVID-19 in Iraq in general and in the four included Governorates was described by estimating the following indicators:

1. Time interval between detection of first confirmed case in Iraq and appearance of COVID-19 cases in each Governorate.
2. Incidence of COVID-19.
3. Trend of COVID-19 infection.
4. Case fatality rate (CFR) of COVID-19. Death resulting from a laboratory confirmed COVID-19 case (testing positive PCR) of infected group were being counted as COVID-19 Deaths in the current study.

RESULTS

The current study has found that Baghdad was the first one in reporting a confirmed COVID-19 infection among the four studied Iraqi Governorates. First case in Baghdad was diagnosed on March 11th, 2020; only 16 days after the original infection in Iraq (case-0). Then after, it started to be reported in Al-Basra on March 17th, 2020; Nineveh on March 23rd, 2020 and Erbil on March 25th, 2020 (22 days, 29 days and 31 days after announcement of the case-0). Figure 1.
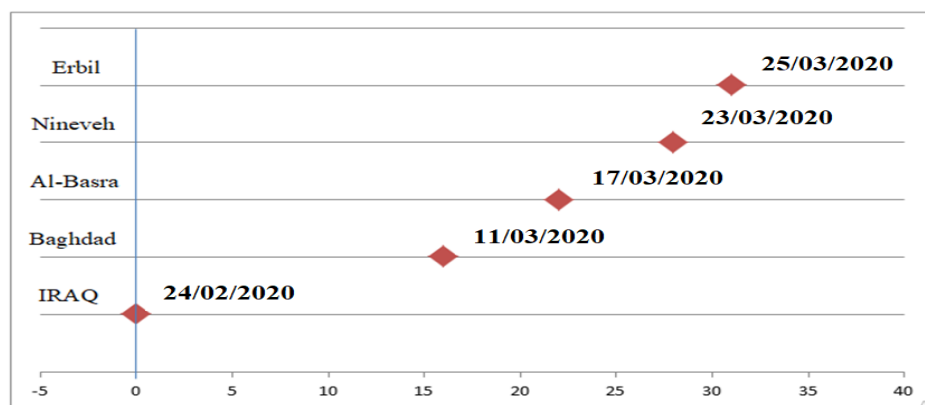

Figure (1): Time lasted by each studied Iraqi Governorate to report its first confirmed COVID-19 infection in days.

Iraq has reported an incidence of COVID-19 as 312 per 100,000 population at the end of July 2020. The incidence was higher in Baghdad (494 per 100,000 population) and Al-Basra (331 per 100,000 population). The lowest incidence was reported in Nineveh (30 per 100,000 population). Third of confirmed cases in Iraq (33.7%) was diagnosed in Baghdad. Table (1).

Table (1): Incidence of COVID-19 in Iraq and the four studied governorates at the end of July 2020.

Location	Population Estimate[*] 01-07-2018	Population Estimate[**] 01-07-2020	No. of confirmed cases	Incidence of COVID-19 Per 100,000	Contribution percent of total incidence
Iraq	38,124,182	39,893,144	124609	312	100
Erbil	1,854,778	1,940,838	4171	215	3.3
Nineveh	3,729,998	3,903,068	1157	30	0.9
Baghdad	8,126,755	8,503,835	41989	494	33.7
Al-Basra	2,908,491	3,043,443	10061	331	8.1

* Central Statistical Organization estimated population at census 2018[6]
** Estimated population by consideration the Yearly Change as (+ 2.32%)[6]

Figure 2 displays trend of COVID-19 infection in Iraq and the four studied governorates during the study period. In Baghdad, COVID-19 incidence markedly raised at beginning of April. While, Erbil, Al-Basra and Iraq in general started to show Baghdad-trend a month later i.e. at beginning of May. The trend in Nineveh is increasing in the slowest manner.
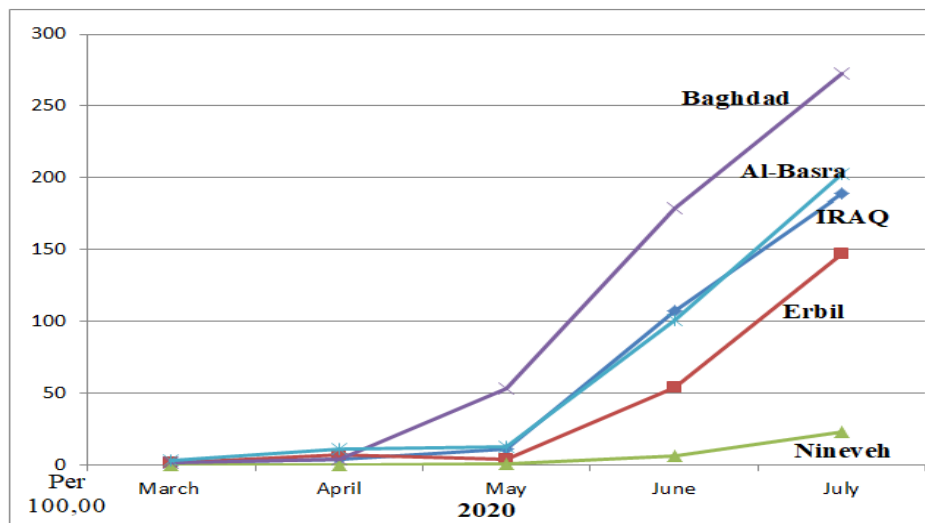

Figure (2): Trend of COVID-19 incidence in Iraq till the end of July 2020.

Case fatality rate (CFR) was estimated by the current study in Iraq and each of the studied Governorates at the end of July 2020 and displayed in table (2). Iraq, in general, reported CFR as 3.8%. the rate seemed to be lower in Erbil (2.9%). Almost third of deaths in Iraq (35.2%) was reported in Baghdad.

Table (2): Case-Fatality Rate (CFR) in in Iraq and the four studied governorates at the end of July 2020.

Location	CFR		Contribution percent of total CFR
	No.	%	
Iraq	4741	3.8	100
Erbil	120	2.9	2.5
Nineveh	45	3.9	1.0
Baghdad	1667	4.0	35.2
Al-Basra	358	3.6	7.6

DISCUSSION

Pandemic of COVID-19 has extended to our country, Iraq only three months after its first appearance in Yohan, China as it was officially announced by Iraqi Ministry of Health and Environment.[4] Beginning of COVID-19 infection in Iraq was in Al-Najaf Governorates, about 160 km (100 mi) south of Baghdad.[6]

Iraqi Authorities rapidly imposed nationwide curfew in order to limit extent of COVID-19 pandemic. Besides, it has adopted health education for encouraging healthy life style that is assisting in prevention and control the spread of infection.[7] However, just few days later, the infection started to be reported in other near-by Governorates before extending to the whole nation, as indicated by the current study and by Habib *et.al*[8] Five months later, COVID-19 incidence in Iraq raised to 312/100,000; Baghdad Governorate reported by its own 494/100,000.

According to the published statistics of the World Health Organization (WHO)[9] Iraq is ranking the second Arabic country after Saudi Arabia; and the 21st among 212 countries in the whole world, in the list of "number of reported confirmed cases" till 31st July 2020. Well, WHO's statistics is concerning with crude number of confirmed cases that are formally reported; without mentioning exposed population. So that incidence as well as actual impact of COVID-19 cannot be assessed nor be compared. A vital point that should be lightened, only cases whose PCR test were positive are being counted in official daily report of Iraqi Ministry of Health. While cases with negative PCR were excluded; even if they presented with clinical and/or radiological findings.

According to Johns Hopkins researchers in June 10, 2020,[10] people during the too early course of infection is

likely to test negative for SARS-CoV-2 (COVID-19) result in a false negative test. They have found that over the 4 days of infection before the typical time of symptom onset (day 5), the probability of a false-negative result in an infected person decreases from 100% on day 1 to 67% (CI, 27% to 94%) on day 4. On the day of symptom onset, the median false-negative rate was 38%; to 20% on day 8 (3 days after symptom onset) then began to increase again, from 21% (on day 9 to 66% (CI, 54% to 77%) on day 21. So, it is recommended to take care in interpreting PCR tests for SARS-CoV-2 infection particularly early in the course of infection; and not rule out clinical presentation.[11] From the above discussion, the actual epidemiologic situation of COVID-19 in Iraq probably under-estimated.

Al-Basra Governorates, and to lesser extend Erbil Governorates in Kurdistan Region, show sharp-raise in COVID-19 incidence since the last May 2020. It stepped up to 331 and 215 per 100,000 respectively. However, Erbil Governorates reported lower CFR (2.9%).

In comparison to other Iraqi Governorates, appearance of COVID-19 in Nineveh was relatively lag and its incidence still behind that in Iraq (30/100,000). But, CFR in Nineveh was almost alike that of Iraq (3.9%); a tragedy that may be attributed to the high virulent infection with the dropped health circumstances in general after Mosul Battles in 2016-2017.[12]

CONCLUSION

Pandemic COVID-19 infected at the end of July 2020, 312 per 100,000 Iraqi population and killed almost four out of a hundred infected patients. Nineveh reported the lowest incidence, but it is increasing.

Recommendation
The current study recommends that clinical and radiological presentation should be considered in COVID-19 case-confirmation.

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