Research Article

Variation in COVID-19 among Eastern Mediterranean Region Countries: A Comparative Study

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Abstract

Background: Coronavirus disease 2019 (COVID-19) is spreads in 216 countries and territories among the world including all Eastern Mediterranean Region countries. The aim of the present study was to examine variation of COVID-19 in different income class countries of the Eastern Mediterranean Region.

Methods: Five parameters such as the percentage of variation COVID-19 confirmed cases, the percentage of variation number of deaths, death rate per 1000 confirmed cases, the percentage of variation death rate per 1000 confirmed cases, and tests per one million were calculated.

Results: The results demonstrated that all Eastern Mediterranean Region countries increase in percentage of COVID-19 confirmed cases except Tunisia, the increasing range from 53.5% in Libya to 4.7% in Morocco. Death rate per 1000 confirmed cases range from 230.1 in Yemen to 0.92 in Qatar. Majority of countries increase in percentage of COVID-19 deaths cases number, which range from 43.7% in Iraq to 1.4% in Morocco. Fourteen countries decrease in percentage of death rate per 1000, the decreasing range from 34.9% in Libya to 0.09 in Yemen. The tests per one million range from 265687 in United Arab Emirate to four in Yemen.

Conclusion: The current study findings showed significant variations between the Eastern Mediterranean Region countries, the substantial variation is concerning. The low-income countries appeared more vulnerable compared to high-income countries; the low-income countries should not be alone with this pandemic. Hence then global should be helping these countries and particular plans have to be employed. These must include screening tests COVID-19 virus.

Keywords: Countries; COVID-19; Death Rate; Eastern Mediterranean; Variation

Introduction

Coronavirus disease 2019 (COVID-19) is a possibly severe acute respiratory infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1]. On 31 December 2019, The World Health Organization (WHO) was informed of 44 cases of pneumonia of unknown microbial etiology linked with Wuhan City, Hubei Province, China, Most of the cases in the outbreak reported a relationship to a large seafood and live animal market (Huanan South China Seafood Market) [2]. On March 11, 2020, The World Health Organization (WHO) has declared the coronavirus (COVID-19) outbreak as a global pandemic [3]. Now, COVID-19 spreads in 216 Countries, areas and territories among the world which have been reported 7, 410, 510 confirmed cases and 418, 294 confirmed deaths till to 12 June 2020 [4]. It is assuming that COVID-19 is initiate from bats [5]. Person-to-person spread has been established in public and health settings [6]. According to CDC, COVID-19 can spread through respiratory droplets formed when an infected person sneezes or coughs, touching a surface or body that has the virus on it [7]. The Eastern Mediterranean Region includes 22 member states, with a population of approximately 583 million [8,9]. In the

Eastern Mediterranean Region countries, as of 12 June 2020 more than 737000 cases have been confirmed and more than 16000 death cases. The twenty-two countries of the Eastern Mediterranean Region were classified according to the World Bank income class as the following: Four low income countries (Afghanistan, Somalia, Syria, and Yemen),seven lower-middle income countries (Djibouti, Egypt, Morocco, Pakistan, Palestine, Sudan, and Tunisia), five upper-middle income countries (Iran, Iraq, Jordan, Lebanon, and Libya) and six high-income countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates) [10]. Understanding the disease patterns among the Eastern Mediterranean Region countries could inform public health and policy strategies to alleviate the continuing spread of COVID-19 disease. In this study, we aimed to examine variation of COVID-19 in different income class countries of the Eastern Mediterranean Region.

Material and Methods

Data Collection

The total number of each country population are collected from [11]. COVID-19 reported cases, death cases, total number of tests and test per million are collected from [12]. Six-day data are selected for

the present study.

Study Parameters

Five parameters such as the percentage of variation COVID-19 confirmed cases, the percentage variation number of deaths, death rate per 1000 confirmed cases, the percentage of variation death rate per 1000 confirmed cases, and tests per one million.

Statistical Analysis

Descriptive statistical analyses were done to calculate the percentage of variation COVID-19 confirmed cases, the percentage of variation number of deaths, death rate per 1000 confirmed cases, the percentage of variation death rate per 1000 confirmed cases, and tests per one million in 11 June 2020 and 6 June 2020.

Results

The percentage variation of COVID-19 confirmed cases

Low-Income Countries: Table 1 demonstrated that, among the four low-income countries (Afghanistan, Somalia, Syria, and Yemen), all countries reported increase number of confirmed cases and the percentage of increase in COVID-19 confirmed cases were range from 31.2% in Syria (the highest) to 9.8% in Somalia (the lowest); the rest of other countries were 17.1%, 22.6% for Afghanistan and Yemen respectively.

Lower-Middle Income Countries: Table 2 demonstrated that, among the seven lower-middle income countries (Djibouti, Egypt, Morocco, Pakistan, Palestine, Sudan, and Tunisia), all countries reported increase number of confirmed cases except Tunisia, and the percentage of increase in COVID-19 confirmed cases were range from 27.2% in Pakistan to 0.0% in Tunisia; the rest of other countries were 21.8%, 8.2%, 5.5%, 4.9%, and 4.7% for Egypt, Sudan, Djibouti, Palestine, and Morocco respectively.

Upper-Middle Income Countries: Table 3 demonstrated that, among the five upper-middle income countries (Iran, Iraq, Jordan, Lebanon, and Libya), all countries reported increase number of confirmed cases and the percentage of increase in COVID-19 confirmed cases were range from 53.5% in Libya to 6.2% Lebanon; the rest of other countries were 50.2%, 11.9%, 6.3% for Iraq, Jordan, and Iran respectively.

High-Income Countries: Table 4 demonstrated that, among the six high-income countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates), all countries reported increase number of confirmed cases and the percentage of increase in COVID-19 confirmed cases were range from 24.6% in Oman to 7.1% in United Arab Emirates; the rest of other countries were17.3%,

15.6%, 11.7%, 10.6% for Saudi Arabia, Bahrain, Qatar, and Kuwait respectively.

The percentage variation number of deaths

Low-Income Countries: The results demonstrated that among the four low-income countries, two countries reported increase the percentage of COVID-19 number of deaths (Afghanistan, and Yemen); the percentage of variations range from 30.3% in Afghanistan, followed by Yemen 22.3% to 0.0% in Somalia and Syria (Table 1).

Lower-Middle Income Countries: The results demonstrated that, among the seven lower-middle income countries, all countries reported increase the percentage of COVID-19 number of deaths except Tunisia and Palestine, the percentage of variations range from 42.3% in Djibouti to 0.0% in Tunisia and Palestine; the rest of other countries were 21.8% 14.9%, 11.7%, 1.4% for Pakistan, Egypt, Sudan, and Morocco respectively (Table 2).

Upper-Middle Income Countries: The results demonstrated that, among the five upper-middle income countries, all countries reported increase the percentage of COVID-19 number of deaths except Jordan and Libya, the percentage of variations range from 43.7% in Iraq to 0.0% in Jordan and Libya; the rest of other countries were 6.9%, 4.6% for Lebanon and Iran respectively (Table 3).

High-Income Countries: The results demonstrated that among the six high income countries, all countries reported increase the percentage of COVID-19 number of deaths, the percentage of variations range from 41.7% in Bahrain to 4.0% in United Arab Emirates; the rest of other countries were 35.3%, 26.8% 23.6%, 9.8% for Qatar, Saudi Arabia, Oman, and Kuwait respectively (Table 4).

Death rate per 1000 confirmed cases

Low-Income Countries: The results demonstrated that among the four low-income countries, In 6 June 2020, the results demonstrated that among the four low-income countries, death rate range from 230.3/1000 in Yemen to 16.7/1000 in Afghanistan; the rest of other countries were 48.0/1000, 35.8/1000 for Syria and Somalia respectively. In 11 June 2020, the results demonstrated that among the four low-income countries, death rate range from 230.1/1000 in Yemen to 18.6 /1000 in Afghanistan; the rest of other countries were 36.6/1000, 33.8/1000 for Syria and Somalia respectively (Table 1).

Lower-Middle Income Countries: In 6 June 2020, the results demonstrated that among the seven lower-middle income countries, death rate range from 59.0/1000 in Sudan to 6.2/1000 in Djibouti, the rest of other countries were 45.1/1000, 36.7/1000, 25.5/1000, 20.6/1000, 6.5/1000 for Tunisia, Egypt, Morocco, Pakistan, and

Table 1: Total population, confirmed case, deaths, death rate, due to COVID-19 and total number of tests, test/1 million in low-income countries among eastern Mediterranean region.

NO	Country	Total population	Confirmed case			Deaths			Death Rate/1000			Total number of tests	Tests/1 M
			A*	B*	C*	A*	B*	C*	A*	B*	C*		
1	Afghanistan	38,928,346	19551	22890	17.1	327	426	30.3	16.7	18.6	11.4	53,705	1,381
2	Somalia	15,893,222	2289	2513	9.8	82	85	0	35.8	33.8	-5.6	NA	NA
3	Syria	17,500,658	125	164	31.2	6	6	0	48	36.6	-23.8	NA	NA
4	Yemen	29,825,964	482	591	22.6	111	136	22.3	230.3	230.1	-0.09	120	4

A= 6/6/2020; B*=11/6/2020; C*= Percentage variation ((B*-A*)/A*) x100) (%); NA= Not available*

Table 2: Total population, confirmed case, deaths, death rate, due to COVID-19 and total number of tests, test/1 million in lower -middle-income countries among eastern Mediterranean region.

NO	Country	Total population	Confirmed case			Death			Death rate/1000			Total number of tests	Test/1 M
			A*	B*	C*	A*	B*	C*	A*	B*	C*		
1.	Djibouti	988,000	4169	4398	5.5	26	37	42.3	6.2	8.4	35.5	40,356	40,880
2.	Egypt	102,334,404	32612	39726	21.8	1198	1377	14.9	36.7	34.7	-5.4	135,000	1,321
3.	Morocco	36,910,560	8151	8537	4.7	208	211	1.4	25.5	24.7	-3.1	389,142	10,550
4.	Pakistan	220,892,340	93983	119536	27.2	1935	2356	21.8	20.6	19.7	-4.4	809,169	3,667
5.	Palestine	5,101,414	464	487	4.9	3	3	0	6.5	6.2	-4.6	44,876	8,809
6.	Sudan	43,849,260	6081	6582	8.2	359	401	11.7	59	60.9	3.2	401	9
7.	Tunisia	11,818,619	1087	1087	0	49	49	0	45.1	45.1	0	57,273	4,849

A= 6/6/2020; B*=11/6/2020; C*= Percentage variation ((B*-A*)/A*) x100) (%); NA= Not available*

Table 3: Total population, confirmed case, deaths, death rate, due to COVID-19 and total number of tests, test/1 million in upper -middle-income countries among eastern Mediterranean region.

NO	Country	Total population	Confirmed case			Deaths			Death rate/1000			Total number of tests	Tests/1 M
			A*	B*	C*	A*	B*	C*	A*	B*	C*		
1.	Iran	83,992,949	169,425	180156	6.3	8209	8584	4.6	48.4	47.6	-1.6	1,196,947	14,261
2.	Iraq	40,222,493	11,098	16675	50.2	318	457	43.7	28.6	27.4	-4.2	349,625	8,704
3.	Jordan	10,203,134	795	890	11.9	9	9	0	11.3	10.1	-10.6	257,149	25,216
4.	Lebanon	6,825,445	1,320	1402	6.2	29	31	6.9	22	22.1	0.4	103,390	15,145
5.	Libya	6,871,292	256	393	53.5	5	5	0	19.5	12.7	-34.9	11,765	1,714

A= 6/6/2020; B*=11/6/2020; C*= Percentage variation ((B*-A*)/A*) x100) (%); NA= Not available*

Table 4: Total population, confirmed case, deaths, death rate, due to COVID-19 and total number of tests, test/1 million in high-income countries among eastern Mediterranean region.

NO	Country	Total population	Confirmed case			Deaths			Death rate /1000			Total number of tests	Tests/1 M
			A*	B*	C*	A*	B*	C*	A*	B*	C*		
1.	Bahrain	1,701,575	14,383	16667	15.6	24	34	41.7	1.7	2	17.6	403,036	237,420
2.	Kuwait	4,270,571	31,131	34432	10.6	254	279	9.8	8.2	8.1	-1.2	330,129	77,368
3.	Oman	5,106,626	16,016	19954	24.6	72	89	23.6	4.5	4.4	-2.2	133,029	26,092
4.	Qatar	2,881,053	67,195	75071	11.7	51	69	35.3	0.76	0.92	21	280,665	99,959
5.	Saudi Arabia	34,813,871	98,869	116021	17.3	676	857	26.8	6.8	7.4	8.8	1,042,312	29,966
6.	United Arab Emirates	9,890,402	38,268	40986	7.1	275	286	4	7.2	7	-2.8	2,626,000	265,687

A= 6/6/2020; B*=11/6/2020; C*= Percentage variation ((B*-A*)/A*) x100) (%); NA= Not available*

Palestine respectively. In 11 June 2020, the results demonstrated that among the seven lower-middle income countries, death rate range from 60.9/1000 in Sudan to 6.2/1000 in Palestine; the rest of other countries were 45.1/1000, 34.7/1000, 24.7/1000, 19.7/1000, 8.4/1000 for Tunisia, Egypt, Morocco, Pakistan, and Djibouti respectively (Table 2).

Upper-Middle Income Countries: In 6 June 2020, the results demonstrated that among the five upper-middle income countries, death rate range from 48.4/1000 in Iran to 11.3/1000 in Jordan, the rest of other countries were 28.6/1000, 22.0/1000, 19.5/1000 for Iraq, Lebanon, and Libya Respectively. In 11 June 2020, the results demonstrated that among the five upper-middle income countries, death rate range from 47.6/1000 in Iran to 10.1/1000 in Jordan; the rest of other countries were 27.4/1000, 22.1/1000, 12.7/1000 for Iraq, Lebanon, and Libya Respectively (Table 3).

High-Income Countries: In 6 June 2020, the results demonstrated that among the six high-income countries, death rate range from

8.2/1000 in Kuwait to 0.76/1000 in Qatar; the rest of other countries were 7.2/1000, 6.8/1000, 4.5/1000, 1.7/1000 for United Arab Emirates, Saudi Arabia, Oman, and Bahrain respectively. In 11 June 2020, the results demonstrated that among the six high-income countries, death rate range from 8.1/1000 in Kuwait to 0.92/1000 in Qatar; the rest of other countries were 7.4/1000, 7.0/1000, 4.4/1000, 2.0/1000 for Saudi Arabia, United Arab Emirates, Oman, and Bahrain respectively (Table 4).

The percentage of variation death rate per 1000 confirmed cases

Low-Income Countries: The results demonstrated that among the four low income countries, three countries reported decrease the percentage of COVID-19 death rate/1000 (Somalia, Syria, and Yemen), the decrease range from 23.8% in Syria, followed by 5.6% in Somalia and .09 in Yemen. Afghanistan data reported increased the percentage of COVID-19 death rate by 11.4% (Table 1).

Lower-Middle Income Countries: The results demonstrated

that among the seven lower-middle income countries, four countries reported decrease the percentage of COVID-19 death rate/1000 (Egypt, Morocco, Pakistan, and Palestine), the decrease range from 5.4% in Egypt, followed by 4.6% in Palestine to 3.1% in Morocco and 4.4% in Pakistan. Djibouti and Sudan data demonstrated increase the percentage of COVID-19 death rate/1000, for Tunisia there is no change in the percentage of COVID-19 death rate (Table 2).

Upper-Middle Income Countries: The results demonstrated that among the five upper-middle income countries, all countries data reported decrease the percentage of COVID-19 death rate/1000 except Lebanon increased by 0.4%, the decrease range from 34.9% in Libya, Followed by 10.6% in Jordan to 1.6% in Iran, followed by 4.6% in Iraq (Table 3).

High-Income Countries: The results demonstrated that among the six high-income countries, United Arab Emirates, Oman, and Kuwait data reported decrease the percentage of COVID-19 death rate by 2.8%, 2.2%, 1.2% respectively. On the other hand, Qatar, Bahrain, and Saudi Arabia data reported increase the percentage of COVID-19 death rate by 21.0%, 17.6%, 8.8% respectively (Table 4).

Tests per one million

Low-Income Countries: The results demonstrated that among the four low-income countries, the tests per one million range from 1381 in Afghanistan to four in Yemen; data not available for Somalia and Syria (Table 1).

Lower-Middle Income Countries: The results demonstrated that among the seven lower-middle income countries, the tests per one million range from 40880 in Djibouti to 9 in Sudan, the rest of other countries were 10550, 8809, 4849, 3667, 1321 for Morocco, Palestine, Tunisia, Pakistan, and Egypt respectively (Table 2).

Upper-Middle Income Countries: The results demonstrated that among the five upper-middle income countries, the tests per one million range from 25216 in Jordan to 1714 in Libya, the rest of other countries were15145, 14261, and 8704 for Lebanon, Iran, and Iraq respectively (Table 3).

High-Income Countries: The results demonstrated that among the six high-income countries, the tests per one million range from 265687 in the United Arab Emirate to 26092 in Oman, the rest of other countries were 237420, 99959, 77368, and 29966 For Bahrain, Qatar, Kuwait, and Saudi Arabia respectively (Table 4).

Discussion

The current study findings showed significant variations between the Eastern Mediterranean Region countries in the number of deaths, death rate per 1000 confirmed cases and tests per one million. The substantial variation in the rates for COVID-19 in Eastern Mediterranean Region countries is concerning. The low-income countries appeared more vulnerable compared to high-income countries. After six days, all countries data demonstrated increase in percentage of COVID-19 confirmed cases except Tunisia, the increasing range from 53.5% in Libya, followed by Iraq 50.2% to 4.7% in Morocco, followed by Palestine with 4.9%. Majority of countries data demonstrated increase in percentage of COVID-19 deaths cases number except five countries (Somalia, Syria, Palestine, Jordan, and Libya), the increasing range from 43.7% in Iraq, followed by Djibouti

42.3% to 1.4% in Morocco, followed by United Arab Emirate with 4%.

Death rate per 1000 confirmed cases among Eastern Mediterranean region countries range from 230.1 in Yemen, followed by Sudan with 60.9 to 0.92 in Qatar, Followed by Bahrain with two. In term of percentage change in death rate per 1000, fourteen countries (Somalia, Syria, Yemen, Egypt, Morocco, Pakistan, Palestine, Iran, Iraq, Jordan, Libya, Kuwait, Oman, and United Arab Emirates) demonstrated, decrease in percentage death rate per 1000, the decreasing range from 34.9% in Libya , followed by Syria with 23.8% to .09 in Yemen , followed by Kuwait with 1.2%; seven countries (Afghanistan, Djibouti, Sudan, Lebanon, Bahrain, Qatar, and Saudi Arabia) demonstrated, increase in percentage death rate per 1000, the increasing range from 35.5% in Djibouti to 0.4% in Lebanon. Only Tunisia country has constant death rate per 1000.

The results demonstrated that among the Eastern Mediterranean Region countries, the tests per one million range from 265687 in United Arab Emirate, followed by Bahrain with 237420 to 4 in Yemen, followed by Sudan with 9/M. Data not available for Somalia and Syria. The low-income countries, which has the highest death rate per/1000 had the lowest tests for COVID-19 than other countries in the Eastern Mediterranean region. Yemen had the highest death rate 230.1 per/1000, and the lowest number of tests 4/M. In spite of that, the world and WHO was unified to fight against COVID-19, the low-income countries should not be alone with this pandemic. Hence then global alert should be helping these countries and particular plans have to be employed. These must include screening tests, COVID-19 virus, specially detection of corona by blood quick tests or swabs which to be mandatory employed, the basic needs such as gloves, masks and sanitizers which deficient in these countries, and also, quarantine places for suspicious cases.

Conclusion

In conclusion, the current study findings showed significant variations between the Eastern Mediterranean Region countries, the substantial variation is concerning. The low-income countries appeared more vulnerable compared to high-income countries; the low-income countries should not be alone with this pandemic. Hence then global should be helping these countries and particular plans have to be employed. These must include screening tests COVID-19 virus.

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