

Impact of COVID-19 on Affected Individuals in Iraq Focusing on Deceased Cancer Patients

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PURPOSE Mortality because of COVID-19 infections is continuously increasing among the high-risk groups, namely, elderly patients and those with underlying comorbidities including cardiovascular diseases, diabetes, respiratory problems, and cancer. The study aimed to assess the impact of COVID-19 on affected individuals in Iraq, focusing on the characteristics of COVID-19 deceased cases, with special emphasis on cancer as the associated comorbidity.

PATIENTS AND METHODS This is a retrospective review of the data collected from 15,852 case investigation records of deceased patients with COVID-19, from all over Iraq, between March 20, 2020, and December 20, 2021. The analyzed variables included patients' age, sex, duration of stay in hospital, use of mechanical ventilation, and associated morbidities. Comparisons of having comorbidities and cancer with the characteristics were carried out using the chi-square test of independence. The chi-square test of goodness of fit was used to describe the distribution of the characteristics of the deceased COVID-19 patients; *P* values < .05 were considered statistically significant.

RESULTS Overall, 62% were ≥ 60 years with a predominance of male (63.2%). Patients with cancer were significantly younger (41.5% were ≥ 60) with no difference concerning sex distribution. Almost 70% of patients who died from COVID-19 infection had associated comorbidities. Cardiovascular diseases, diabetes, chronic obstructive pulmonary diseases, and cancer constituted 49.7%, 39.3%, 2.9%, and 1.1%, respectively. Patients with a history of cancer had a significantly longer duration of stay in hospital with no statistical association regarding the use of ventilation.

CONCLUSION In Iraq, patients with cancer infected with COVID-19 were younger and spent longer durations in the hospital before they died than patients with other comorbidities. The pandemic has revealed significant gaps in the health information and surveillance systems that demand prompt strengthening as part of the emergency preparedness.

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INTRODUCTION

After almost 2 years since the onset of the COVID-19 pandemic, countries are still enduring heterogeneous responses to the disease across various regions of the world.¹ This global health emergency displayed significant inequality in health care access and deficit in the relevant infrastructure even among the top indexed countries on the Global Health Security Preparedness.² New transmissible variants, different from those already recognized globally, are continuously emerging and circulating worldwide.³ As of December 21, 2021, 274,628,461 confirmed cases have been reported worldwide including 5,358,978 deaths.⁴

Mortality because of COVID-19 infections is continuously increasing among the high-risk groups, namely,

elderly patients and those with underlying comorbidities comprising cardiovascular diseases (CVDs), diabetes, respiratory problems, and cancer.^{5,6} Pre-existing comorbid conditions among those patients are directly associated with hospital admissions and the need for mechanical ventilation.⁷ Concurrently, the immunosuppressed status of some patients, specifically those with a history of cancer, increases the risk of infection by the disease and subsequent complications, ultimately yielding delayed treatment, prolonged hospitalizations, and worse prognosis.^{8,9}

In general, the burden of noncommunicable diseases (NCDs) including cancer continues to grow globally exerting tremendous strain on health systems specifically in developing countries that are least prepared to manage its consequences.¹⁰ The top four killers that

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CONTEXT

Key Objective

What are the characteristics of COVID-19–related deaths among patients with cancer in Iraq?

Knowledge Generated

In about 70% of cases of COVID-19–related deaths in Iraq, the affected patients had associated comorbidities illustrated mainly as cardiovascular diseases, diabetes chronic obstructive respiratory diseases, and cancer. Patients with cancer were significantly younger and needed longer durations of stay in the hospitals before they died.

Relevance

To achieve an optimum description of the characteristics of COVID-19–affected cases and COVID-19–related deaths, there is an urgent need to strengthen the health information system through integration of surveillance and documentation of continuum of care as part of the emergency pandemic preparedness, specifically among patients with cancer and other comorbidities.

account for more than 80% of all NCD deaths worldwide, in order of sequence, are CVDs, cancers, respiratory disorders, and diabetes.¹¹ In Iraq, cancer is the third cause of death after heart and cerebrovascular diseases.¹² From January 3, 2020, to December 21, 2021, the coronavirus dynamic infographic dashboard of Iraq has reported 2,090,844 cumulative cases of COVID-19 and 24,074 deaths from the disease.¹³

This study was conducted to assess the impact of COVID-19 on affected individuals in Iraq, focusing on the characteristics of the related deaths, with special emphasis on cancer as the associated comorbidity.

PATIENTS AND METHODS

Patients

All available data of COVID-19 deaths in Iraq were analyzed using simple descriptive statistics to identify the characteristics of COVID-19 deaths. The data set covers the period from March 20, 2020, till December 20, 2021.

Data Source and Description

This is a retrospective review of the data set that was collected as part of the case investigation forms filled in by the respiratory unit's officers all over Iraq. The data were compiled at the Communicable Diseases Control Center/Public Health Directorate/Ministry of Health (MOH). The case investigation form has the minimum required information, such as name, age, sex, residence, date of reporting, date of death, presence of comorbidities (CVDs, diabetes, chronic obstructive pulmonary diseases [COPDs], malignancies, and others), the severity of the deceased COVID-19 patients' measures by the requirement of ventilation, delay to arrival to hospital measured by the duration of stay in hospital before death, and history of travel and contact with other patients. Data were deidentified to ensure the privacy of the patients.

Statistical Analysis

Counts and relative frequencies were used to describe the characteristics of COVID-19 deaths in terms of age groups

(< 20, 20-39, 40-59, 60-79, and 80+ years), sex (male and female), delay to arrival to hospital measured by their duration of stay in hospitals before death (died in the same day, 1-2 days, 3-9 days, 10-19 days, and 20+ days), travel history (yes, no), and history of contact with a patient with COVID-19 (yes, no). In addition, the presence of one or more comorbidities was first described as (yes, no) followed by each comorbidity (with or without the presence of others) as (yes, no). Moreover, the severity of the deceased COVID-19 patients measured by the requirement of ventilation of any kind (O₂, continuous positive airway pressure [CPAP], and bilevel positive airway pressure) was reported as a (yes, no) variable. The chi-square test of goodness of fit was used for the univariate analysis, and *P* values lower than .05 were considered statistically significant.

In the bivariate analysis, those with comorbidities were compared with those with no comorbidities and those with malignancies were compared with those with no malignancies in terms of the aforementioned factors using the chi-square test of independence. Finally, a comparison of each of the comorbidities concerning the characteristics was done using the chi-square test of independence, too. *P* values lower than .05 were considered statistically significant.

RESULTS

COVID-19 death database showed that there was information about 15,852 (70.0%) deceased COVID-19 patients reported from March 20, 2020, until December 20, 2021, with missing information in 1,818 (11.5%) records for the presence or lack of comorbidities. Therefore, that 11.5% were excluded during the bivariate analysis of each of the comorbidities with the characteristics of COVID-19 deaths.

Table 1 shows that the majority of the deceased COVID-19 patients were age 40-79 years (82.3%) and male (63.2%). Nearly 50% of them were age 60-79 years. About 42% of patients with COVID-19 who were admitted to the hospital

TABLE 1. Characteristics of COVID-19 Deceased Patients

Characteristic	No. (%)	P
Age groups, years	15,852 (100.00)	< .001
< 20	101 (0.64)	
20-39	993 (6.26)	
40-59	4,930 (31.10)	
60-79	8,111 (51.17)	
80+	1,703 (10.74)	
Missing	14 (0.09)	
Sex		.008
Female	5,827 (36.76)	
Male	10,025 (63.24)	
Duration of stay in hospital, days		.001
Died on the same day	2,677 (16.89)	
1-2	4,097 (25.85)	
3-9	5,232 (33.01)	
10-19	2,761 (17.42)	
20+	1,085 (6.84)	
Use of ventilators		< .001
Yes/O ₂ /CPAP/BiPAP	5,504 (34.72)	
No	9,504 (59.95)	
Missing	844 (5.32)	
Travel history		< .001
No	14,927 (94.16)	
Missing	910 (5.74)	
Yes	15 (0.09)	
History of contact		< .001
No	13,258 (83.64)	
Missing	944 (5.96)	
Yes	1,650 (10.41)	
Have comorbidities		< .001
Have comorbidities	9,800 (61.82)	
No comorbidities	4,234 (26.71)	
Missing	1,818 (11.47)	
CVD		< .001
No	6,900 (43.53)	
Yes (alone or with other comorbidities)	7,134 (45.00)	
Missing	1,818 (11.47)	
Diabetes		< .001
No	8,513 (53.70)	
Yes (alone or with other comorbidities)	5,521 (34.83)	
Missing	1,818 (11.47)	
COPD		< .001
No	13,621 (85.93)	
Yes (alone or with other comorbidities)	413 (2.61)	
Missing	1,818 (11.47)	
Cancer		< .001
No	13,870 (87.50)	
Yes (alone or with other comorbidities)	164 (1.03)	
Missing	1,818 (11.47)	

(Continued in next column)

TABLE 1. Characteristics of COVID-19 Deceased Patients (Continued)

Characteristic	No. (%)	P
Other comorbidities		< .001
No	13,021 (82.14)	
Yes (alone or with other comorbidities)	1,013 (6.39)	
Missing	1,818 (11.47)	

Abbreviations: BiPAP, bilevel positive airway pressure; COPD, chronic obstructive pulmonary disease; CPAP, continuous positive airway pressure; CVD, cardiovascular disease.

died within 0-2 days. Only 34.7% were on ventilators, O₂, or CPAP, whereas 25% had missing information regarding the use of any ventilation. Regarding the history of travel and contact with another patient with COVID-19, only 0.1% had a history of travel, whereas 10.0% had a history of contact with another patient. Another 5% of the records had missing information regarding history of travel and history of contact.

Most of the deceased COVID-19 patients had a history of one or more comorbidities (about 70% if we exclude the missing cases). That is, about 45.0% had CVDs (alone or with other comorbidities), 34.8% had diabetes (alone or with other comorbidities), 6.0% had other comorbidities, 2.6% had COPD (alone or with other comorbidities), and only 1.0% had malignancy (alone or with other comorbidities). The chi-square test of goodness of fit for characteristics of the deceased COVID-19 patients showed statistically significant *P* values for all the variables included in the study.

The comparison of the deceased patients with and without comorbidities revealed statistically significant associations between having comorbidity and age (*P* < .001), sex (*P* = .002), delayed arrival to hospital measured by the duration of stay in hospital before death (*P* = .007), and severity measured by the need to use assisted ventilation (*P* < .001; [Table 2](#)).

Similarly, by comparing the characteristics of those with malignancy with those with no malignancy, there were statistically significant associations between having malignancy and age (*P* < .001) and the duration of stay in hospital before death (*P* < .001; [Fig 1](#) and [Table 3](#)).

Comparing each of the comorbidities with each other in terms of age, sex, duration of stay, and the use of ventilators, all showed significant associations, with the exception of patients with malignancy that revealed an insignificant relationship with sex and the need to use assisted ventilation and the insignificant association between COPD and sex ([Table 4](#)).

DISCUSSION

The repeated outbreaks of COVID-19 are spreading rapidly across the globe presenting a continuous risk of emerging new mutated virulent strains that disrupt the general

socioeconomic activities.^{1,3} The beginning of the pandemic was declared by the WHO in March 2020 as a public health emergency of international concern specifically in countries with vulnerable health systems.¹⁴ In Iraq, the long-lasting sequelae of continuous wars, sanctions, local conflicts, and displacements have yielded a fragile under-resourced health care structure that was seriously hit by the pandemic.^{15,16} The situation was exacerbated by the poor compliance of the community with the preventive measures instructed by the health authorities that exerted overwhelming pressure on the hospital bed capacity of the Iraqi MOH.^{15,17} As of December 21, 2021, the COVID-19 situation dashboard of Iraq registered an overall fatality rate of 1.1% (cumulative 24,074 deaths among 2,090,844 confirmed cases), displaying a drop in the daily number of confirmed cases as the third wave receded probably after the vaccination campaign and the rollout of the third booster dose.¹³

Our retrospective review, on the compiled data retrieved from the Communicable Diseases Control Center of the MOH, showed that approximately 70% of patients who died from COVID-19 infection in Iraq had associated comorbidities. Although this prevalence was very close to that reported in an earlier study from a neighboring Arab country,¹⁸ it was significantly lower than that demonstrated

by other studies analyzed on COVID-19 hospitalization records in which the underlying medical conditions exceeded 90%.^{19,20} This could probably reflect the superior quality of data collected by medical chart abstraction over the standard public health surveillance in developed countries. Almost half of the comorbid conditions in this study (49.7%) were due to CVDs, whereas diabetes, COPDs, and cancer formed 39.3%, 2.9%, and 1.1%, respectively. The corresponding death rates of these NCDs among the general Iraqi population before the COVID-19 era were 27%, 4%, 2%, and 11%, respectively.²¹

A recent CDC report characterizing the comorbidities for coronavirus disease deaths among patients in Tennessee, revealed that CVDs, diabetes, cancer, and chronic lung diseases were registered in 40.6%, 36.6%, 4.3%, and 20.5%, respectively. The significantly higher rate of chronic lung diseases in their study is attributed to the fact that the term comprised asthma, emphysema, pulmonary hypertension, interstitial fibrosis, and sarcoidosis in addition to COPDs.²⁰ Relatively, a multicenter retrospective cohort study on the risk factors associated with worst outcomes and deaths among Saudi patients with COVID-19 displayed that 31.2%, 20.8%, 22.1%, and 6.5% had CVDs, diabetes, chronic respiratory diseases, and cancer/immune deficiency, respectively.¹⁸

The overall age and gender distribution of the deceased patients in this study demonstrated that about 62% were age \geq 60 years with a predominance of male (63.2%) versus female (36.8%). This was in line with the findings reported in earlier studies, which indicated that age and sex are well-established risk factors for COVID-19–related death.^{15,18-20,22} Similarly, in the United Kingdom, 60% of deaths from the pandemic were registered among men, but more than 90% were older than 60 years, attributed to the longer life expectancy of the British population and the competency of their national health system.²³ On the other hand, a focus on patients with cancer in this study highlights that they were significantly younger (41.5% were age \geq 60 years, whereas 27.4% were age $<$ 40 years), compared with (72.9%, 2.2%), (70.9%, 2.9%), and (56.7%, 9.7%) among those who had CVDs, diabetes and COPDs, respectively. Our data did not reveal any significant difference regarding sex distribution of cancer cases contrary to that observed among cases with CVD and diabetes in this study and in contrast to the findings recorded in other surveys,^{24,25} which showed a predilection to affect men. This could probably reflect the higher incidence of cancers among female in Iraq with a male to female ratio of 1:1.3.¹²

In general, the unprecedented strain of the pandemic on the health care system has fragmented the full scope of cancer control through delaying prevention, diagnosis, and screening and by halting therapy, clinical trials, and other supportive strategies.⁹ Systematic reviews and large meta-analytical research illustrated that the weakened immune

TABLE 2. Characteristics of COVID-19 Deaths by the Presence of Comorbidities

Characteristic	Comorbidities		P
	No. (%)	No Comorbidities No. (%)	
Age groups, years	9,800	4,234	< .001
< 20	59 (0.6)	29 (0.7)	
20-39	436 (4.5)	436 (10.3)	
40-59	2,729 (27.8)	1,676 (39.6)	
60-79	5,295 (54.0)	1,841 (43.5)	
80+	1,272 (13.0)	247 (5.8)	
NA	9 (0.1)	5 (0.1)	
Sex			.002
Female	3,702 (37.9)	1,468 (34.7)	
Male	6,098 (62.2)	2,766 (65.3)	
Duration of hospital stay, days			.007
Died on the same day	1,476 (15.1)	581 (13.7)	
1-2	2,718 (27.7)	1,131 (26.7)	
3-9	3,273 (33.4)	1,428 (33.7)	
10-19	1,703 (17.4)	762 (18.0)	
20+	630 (6.4)	332 (7.8)	
Need for assisted ventilation			< .001
Yes/O ₂ /CPAP/BiPAP	5,742 (58.6)	2,651 (62.6)	
No	3,787 (38.6)	1,464 (34.6)	
Missing	271 (2.8)	119 (2.8)	

Abbreviations: BiPAP, bilevel positive airway pressure; CPAP, continuous positive airway pressure; NA, not applicable.

TABLE 3. Characteristics of COVID-19 Deceased Patients Who Had Cancer as the Associated Comorbidity

Characteristic	Cancer No. (%)	No Cancer No. (%)	P
Age groups, years	164	13,870	< .001
< 20	14 (8.5)	74 (0.5)	
20-39	31 (18.9)	841 (6.1)	
40-59	51 (31.1)	4,354 (31.4)	
60-79	58 (35.4)	7,078 (51.0)	
80+	10 (6.1)	1,509 (10.9)	
Sex			.244
Female	67 (40.9)	5,103 (36.8)	
Male	97 (59.1)	8,767 (63.2)	
Duration of hospital stay, days			< .001
Died on the same day	10 (6.1)	2,047 (14.8)	
1-2	35 (21.3)	3,814 (27.5)	
3-9	57 (34.8)	4,644 (33.5)	
10-19	34 (20.7)	2,431 (17.5)	
20+	28 (17.1)	934 (6.7)	
Use of assisted ventilation			.153
Yes/O ₂ /CPAP/BiPAP	71 (43.3)	5,180 (37.3)	
No	92 (56.1)	8,301 (59.9)	
Missing	1 (0.6)	389 (2.8)	

Abbreviations: BiPAP, bilevel positive airway pressure; CPAP, continuous positive airway pressure.

system of patients with cancer predisposes them to a higher risk of developing COVID 19 infection and eventually worse outcomes than the general population.^{8,26,27} The immune system gets compromised when cancer or its treatment procedures (chemotherapy and/or radiotherapy) affect the

bone marrow impairing its capability to combat infection.²⁸ The registered rate for the lethal impact of the pandemic on cancer individuals in this retrospective review (1.1%) seems relatively low when compared with other studies.^{6,18,20} This could be due to poor documentation of the full medical history, under-reporting of the cancer status by patients because of social stigma, or the reluctance to seek medical advice early after infection, leading to subsequent progression of the disease and death before arrival to the hospital. These possibilities highlight critical issues related to the effect of COVID-19 on patients with cancer in Iraq and urge the necessity to implement a robust surveillance system for tracking patients.^{9,16,29}

Nevertheless, it has been interestingly reported in some studies that there was no evidence of increased mortality among patients with cancer infected by COVID-19, suggesting that the downregulated immune response in these individuals may dampen the cytokine storm and accordingly might yield better clinical outcomes.^{24,30} In an analytical cohort study on Colombian patients with cancer and COVID-19, higher mortality was only recorded in cases of active progressive or metastatic disease.³¹ Concurrently, a meta-analysis on 32 studies from Asia, Europe, and the United States concluded that elderly patients with cancer age > 65 years diagnosed with COVID-19 may not be at increased risk of death, implying that the presence of cancer may not further affect the already burdened prognosis.²⁶

Compared with deceased patients with other comorbidities, patients with a history of cancer who died from the pandemic in this study spent a significantly longer duration in the hospital. It has been agreed that immunodeficient patients with cancer should be treated as an extremely vulnerable population since they are predisposed to severe

FIG 1. Frequency duration of hospitalization among deceased cases (cancer versus CVD and diabetes). CVD, cardiovascular disease; DV, diabetes mellitis.

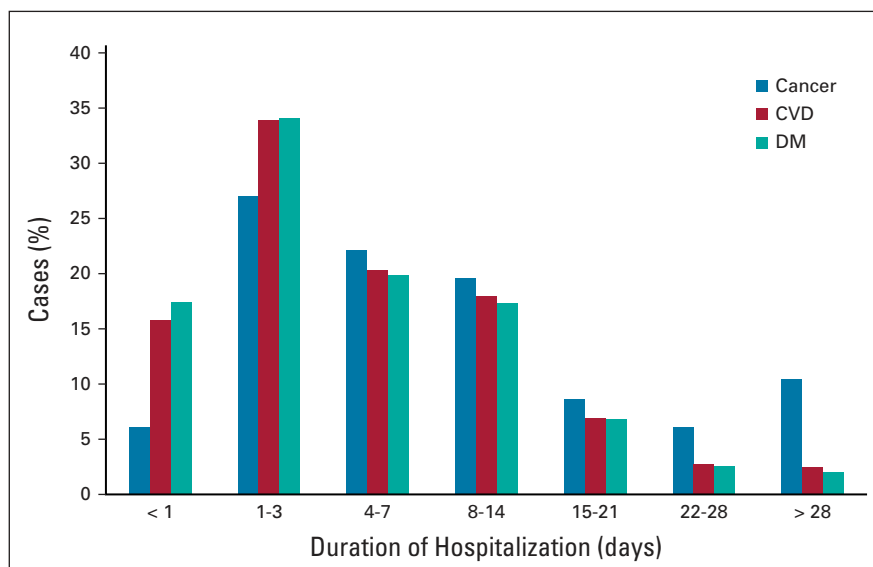


TABLE 4. Characteristics of COVID-19 Deaths According to Comorbidities (cancer, cardiovascular diseases, diabetes, COPD, and others)

Characteristic	Cancer No. (%)	CVD No. (%)	Diabetes No. (%)	COPD No. (%)	Others No. (%)
Age groups, years	164	7,134	5,521	413	1,013
< 20	14 (8.5)	10 (0.1)	12 (0.2)	3 (0.7)	30 (3.0)
20-39	31 (18.9)	150 (2.10)	149 (2.7)	37 (9.0)	142 (14.0)
40-59	51 (31.1)	1,768 (24.8)	1,448 (26.2)	139 (33.7)	242 (23.9)
60-79	58 (35.4)	4,130 (57.9)	3,174 (57.5)	215 (52.1)	444 (43.8)
80+	10 (6.1)	1,073 (15.0)	733 (13.3)	19 (4.6)	154 (15.2)
Missing		3 (0.04)	5(0.1)		1 (0.1)
<i>P</i>	< .001	< .001	< .001	< .001	< .001
Sex					
Female	67 (40.9)	2,702 (37.9)	2,112 (38.3)	135 (33.0)	432 (42.7)
Male	97 (59.1)	4,432 (62.1)	3,409 (61.7)	278 (67.3)	581 (57.3)
<i>P</i>	.28	.009	.005	.07	< .001
Duration of stay in hospital, days					
Died on the same day	10 (6.1)	1,127 (15.8)	953 (17.3)	15 (3.6)	71 (7.0)
1-2	35 (21.3)	1,968 (27.6)	1,573 (28.5)	293 (70.4)	207 (20.4)
3-9	57 (34.8)	2,353 (33.0)	1,734 (31.4)	78 (18.9)	421 (41.6)
10-19	34 (20.7)	1,231 (17.3)	933 (16.9)	22 (5.3)	231 (22.8)
20+	28 (17.1)	455 (6.4)	328 (5.9)	5 (1.2)	83 (8.2)
<i>P</i>	< .001	.009	< .001	< .001	< .001
Use of ventilators					
Yes/O ₂ /CPAP/BiPAP	71 (43.3)	2,829 (39.4)	1,965 (35.6)	52 (12.6)	576 (56.9)
No	92 (56.1)	4,059 (55.9)	3,370 (61.0)	357 (86.4)	430 (42.5)
Missing	1 (0.6)	246 (3.4)	186 (3.4)	4 (1.0)	7 (0.7)
<i>P</i>	.09	< .001	.001	< .001	< .001

Abbreviations: BiPAP, bilevel positive airway pressure; COPD, chronic obstructive pulmonary disease; CPAP, continuous positive airway pressure; CVD, cardiovascular disease.

symptoms of COVID-19, which require longer hospital admissions and intensive care.^{7,8,24-27} However, in contrast to other reports,⁷ our findings did not show a statistical difference among patients with cancer concerning the use of mechanical ventilation. This was consistent with the results of a National Cancer Institute-supported study, which reported that the rates of invasive mechanical ventilation are relatively low in oncology patients with COVID-19, suggesting that such individuals may not be appropriate candidates for critical care interventions.³² Within the same context, another observational cohort study on mechanically ventilated patients with COVID-19 demonstrated that age and a diagnosis of a solid malignant tumor were associated with 30-day mortality.³¹

In conclusion, COVID-19 introduced another threat to the fragile public health system of Iraq, which is partly dismantled through decades of wars, conflicts, and societal distrust. The pandemic has revealed significant gaps in the

health information and surveillance systems that demand prompt strengthening. Our findings illustrated that older patients and those with underlying comorbid conditions were significantly associated with mortality although deceased cancer patients were younger and spent longer durations in the hospital. There is an urgent need to integrate documentation of medical history and continuum of care for patients presenting with cancer and other NCDs as part of the institutional emergency pandemic preparedness to have a clear understanding of the best practices needed to improve outcomes. Future prospective studies are warranted to explore the risk factors in COVID-19-infected individuals who present with comorbid conditions and plan for their appropriate management amid the overwhelmed health care system. Since Iraq did not introduce yet any electronic tool to identify and trace contacts, the best way to control the pandemic remains through reinforcing preventive measures, social distancing, hygiene, and vaccination.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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Open Payments is a public database containing information reported by companies about payments made to US-licensed physicians (Open Payments).

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REFERENCES

- Chen YY, Assefa Y: The heterogeneity of the COVID-19 pandemic and national responses: An explanatory mixed-methods study. *BMC Public Health* 21:835, 2021
- Lal A, Erondu NA, Heymann DL, et al: Fragmented health systems in COVID-19: Rectifying the misalignment between the global health security and universal health coverage. *Lancet* 397:61-67, 2021
- Update on Omicron, World Health Organization, Home Page, Statement, 28, November 2021. <https://www.who.int/news/item/28-11-2021-update-on-omicron>
- WHO Health Emergency Dashboard, WHO Coronavirus (COVID-19) Dashboard With Vaccination Data, Situation for 21 December 2021. WHO, <https://covid19.who.int/>
- Wu Z, McGoogan JM: Characteristic of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: Summary of a report of 72 314 cases from the Chinese center for disease control and prevention. *JAMA* 323:1239-1242, 2020
- Liang W, Guan W, Chen R, et al: Cancer patients in SARS-CoV2 infection: A nationwide analysis in China. *Lancet Oncol* 21:335-337, 2020
- Oliveira E, Parikh A, Lopez-Ruiz A, et al: ICU outcomes and survival in patients with severe COVID-19 in the largest health care system in central Florida. *PLoS One* 16:e0249038, 2021
- Cavalcanti IDL, Soares JCS: Impact of COVID-19 on cancer patients: A review. *Asia Pac J Clin Oncol* 17:186-192, 2021
- Alwan NAS: Impact of COVID-19 on cancer patients. *Iraqi New Med J* 7:66-68, 2021
- Bigna JJ, Noubiap JJ: The rising burden of non-communicable diseases in sub-Saharan Africa. *Lancet Glob Health* 7:e1295-e1296, 2019
- GBD 2015 Risk Factors Collaborators: Global, regional, and national comparative risk assessment of 79 behavioral, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: A systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 388:1659-1724, 2016
- Annual Report. Iraqi Cancer Registry 2019. Iraq, Iraqi Cancer Board, Ministry of Health, 2021
- COVID-19 Dynamic Infographic Dashboard: Iraq 2020-2021. Situation for 14 June 2021. WHO Iraq, Ministry of Health, 2021. <https://covid19.who.int/region/emro/country/iq>
- Cucinotta D, Vanelli M: WHO declares COVID-19 a pandemic. *Acta Biomed* 91:157-160, 2020
- Lami F, Rashak HA, Khaleel HA, et al: Iraq experience in handling the COVID-19 pandemic: Implications of public health challenges and lessons learned for future epidemic preparedness planning. *J Public Health* 43:iii19-iii28, 2021
- Alwan NAS, Kerr D: Cancer control in War-Torn Iraq. *Lancet Oncol* 19:291-292, 2018
- Challenges Faced by the Iraqi Health Sector in Responding to COVID-19. Physicians for Human Rights, 2021. <https://reliefweb.int/report/iraq/challenges-faced-iraqi-health-sector-responding-covid-19-enar>
- Khan A, Althunayyan S, Alsofayan Y, et al: Risk factors associated with worse outcomes in COVID-19: A retrospective study in Saudi Arabia. *East Mediterr Health J* 26:1371-1380, 2020
- Kim L, Garg S, O'Halloran A, et al: Risk Factors for intensive care unit admission and in-hospital mortality among hospitalized adults identified through the U.S. coronavirus disease 2019 (COVID-19)-associated Hospitalization Surveillance Network (COVID-NET). *Clin Infect Dis* 72: e206-e214, 2021
- Parker J, Octaria R, Smith MD, et al: Characteristics, comorbidities, and data gaps for coronavirus disease deaths, Tennessee, USA. *Emerg Infect Dis* 27:2521-2528, 2021
- World Health Organization—Noncommunicable Diseases (NCD) Country Profiles, Risk of Premature Deaths Due to NCDs, Iraq, WHO, 2018. https://cdn.who.int/media/docs/default-source/country-profiles/ncds/irq_en.pdf
- Williamson EJ, Walker AJ, Bhaskaran K, et al: Open SAFELY: Factors associated with COVID-19 death in 17 million patients. *Nature* 584:430-436, 2020
- NHS England: COVID-19 Daily Deaths. 2020. <https://www.england.nhs.uk/statistics/statistical-work-areas/covid-19-daily-deaths/>; <https://web.archive.org/web/20200501094237/>
- Joharatnam-Hogan N, Hochhauser D, Shiu K-K, et al: Outcomes of the 2019 novel coronavirus in patients with or without a history of cancer—A multi-centre North London experience. *Ann Oncol* 31:S1209, 2020

25. Zhang L, Zhu F, Xie L, et al: Clinical characteristics of COVID-19-infected cancer patients: A retrospective case study in three hospitals within Wuhan, China. *Ann Oncol* 31:894-901, 2020
26. Giannakoulis VG, Papoutsis E, Siempos I: Effect of cancer on clinical outcomes of patients with COVID-19: A meta-analysis of patient data. *JCO Glob Oncol* 6:799-808, 2020
27. Tian Y, Qiu X, Wang C, et al: Cancer associates with risk and severe events of COVID-19: A systematic review and meta-analysis. *Int J Cancer* 148:363-374, 2021
28. Qi F, Zhao L, Zhou A, et al: The advantages of using traditional Chinese medicine as an adjunctive therapy in the whole course of cancer treatment instead of only terminal stage of cancer. *Biosci Trends* 9:16-34, 2015
29. Alwan NAS, Shawkat M: Treatment options and follow-up among Iraqi patients diagnosed with breast carcinoma. *Eur J Med Health Sci* 2:1-6, 2020
30. Miyashita H, Mikami T, Chopra N, et al: Do patients with cancer have a poorer prognosis of COVID-19? An experience in New York City. *Ann Oncol* 31:1088-1089, 2020
31. Ospina AV, Bruges R, Mantilla W et al: Impact of COVID-19 infection on patients with cancer: Experience in a Latin American country: The ACHOCC-19 study. *Oncologist* 26:e1761-e1773, 2021
32. Mechanical ventilation rates in oncology patients with COVID-19: Low rates raise questions about eligibility for intervention. NCI COVID-19 in cancer patients study (NCCAPS). Presented at American Society of Clinical Oncology annual meeting, 2021

