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Mortality among COVID-19 Patients with Different Comorbidities in Kermanshah, West of Iran (2020)

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Abstract

Background: Cancer and underlying diseases in the covid-19 pandemic created more problems for those affected by the coronavirus. This study aimed to evaluat patients' mortality and related factors based on underlying diseases in people with COVID-19.
Materials and Methods: This descriptive study was performed on patients with COVID-19 admitted to Kermanshah hospital from February 22, 2020, to September 22, 2021. Clinical information was obtained from medical records and patient's history was extracted from the case documentation. The mortality and case fatality rates in hospitalized COVID-19 cases were calculated. Analysis of logistic regression models was used to identify prognostic factors of death.
Results: Out of 55813 patients admitted to the hospital due to covid-19 on the mentioned date, 4260 died. Furthermore, the most common underlying disease in hospitalized patients due to covid 19 was hypertension (11.4%). The prevalence of cancers was 1.4%. The highest in-hospital case fatality rate was chronic kidney disease (CKD) (21.3%) and cancer (16.6%). In addition, among the underlying diseases, the odds ratio of CKD was 2.12 (CI90%= 1.38- 3.26), and cancers were 2.06 (CI95%= 1.25-3.37), the most important underlying diseases for odds of death.
Conclusion: The prevalence of hypertension (HTN) and cardiovascular diseases (CVD) was higher in hospitalized patients with COVID-19 than patients with other underlying diseases. However, patients with CKD and cancer had a higher odds ratio for death. Therefore, attention to managing patients with CKD and cancers should be seriously considered and followed.

Keywords: COVID-19, Preexisting Diseases, Iran

Introduction

The SARS-COV-2 virus caused a Coronavirus (COVID-19) respiratory disease in China in December 2019, rapidly spreading as a pandemic worldwide. The World Health Organization has declared the new coronavirus illness a global health concern [1]. In this pandemic, although there are mostly mild and moderate reports of infected people, in some cases, serious complications lead to multiple organ failure and eventually death. According to studies, the majority of them have underlying diseases, including high blood pressure, cardiovascular disease, and

diabetes, all of which lead to increased mortality [2, 3].

Another underlying disease in the COVID-19 epidemic that has caused more problems for patients is cancer. Because they take medicines that suppress the systemic immune system, cancer patients are more likely to develop an infection than those without cancer. All of these factors make cancer patients more sensitive to COVID-19, and their prognosis is expected to worsen [4].

Patients who had chemotherapy or surgery in the past 30 days and those with lung cancer had more severe side effects for COVID-19. They had higher rates of respiratory distress syndrome, septic shock, and myocardial infarction [5]. The study in China demonstrated cancer patients had a mortality rate of 5.6 percent, compared to 2.3 percent in the overall population. As a result, cancer patients are considered a particularly susceptible category in the pandemic [6].

Cancer patients usually have multiple risk factors. Cancer patients appear to have an approximately twofold increased risk of contracting coronavirus than the common population [7]. Cancer patients who contracted Covid-19 and were hospitalized reported a high mortality rate [8]. It's worth noting that many of these people developed COVID-19 due to their hospitalization for cancer therapy. Therefore, screening and treating them as an outpatient rather than hospitalizing can help prevent COVID-19 infection and reduce mortality [7]. This study aimed to determine the mortality rate of cancer patients with COVID-19 and compare it to other underlying diseases such as diabetes mellitus, hypertension (HTN), cardiovascular diseases (CVD), and chronic kidney disease (CKD).

Materials and Methods

This cross-sectional study included all COVID-19 patients admitted to Kermanshah hospitals. Kermanshah is a province located in the west of Iran. With 14 cities and around 2100000 population, Kermanshah province is a medical center in the west of Iran and the neighboring country of Iraq. This province has 26 hospitals, and information has been collected from all the above centers. On February 22, 2020, the Kermanshah health officials announced the spread of COVID-19. Within 19 months after the diagnosis of COVID-19 in Kermanshah province, 55813 patients were examined and admitted to hospitals. This study only examined hospitalized patients because information on outpatients was not fully available.

Clinical and demographic data regarding the admitted patients with COVID-19 was acquired from the patient's history and medical records. Cases of COVID-19 were diagnosed using RT_PCR test, CT scan, and clinical criteria. The inclusion criterion was being admitted to the hospital based on the guidelines announced by the Ministry of Health and Medical Education (MOHME).

Data included demographic information, symptoms, contact history, comorbidities, age, gender, laboratory finding (Positive RTC-PCR test, CT finding, SPO2 < 93, Temperature rate), intensive care unit and ICU admission, intubation, length of hospitalization, readmission, and death. The underlying diseases in this study were high blood pressure, cardiovascular diseases, diabetes mellitus, cancer, lung diseases, and chronic kidney disease.

The qualitative variables were described as frequency and percentages, and quantitative variables were presented using median and interquartile range (IQR) values. Normally distributed quantitative variables were presented as means and standard deviations (SD). The normality was checked using the Shapiro-Wilk test. The demographics and clinical characteristics, and mortality rate of admitted patients with the underlying disease were evaluated. Analysis of logistic regression models was used to identify prognostic factors of death. We ran the univariate logistic model on all the predictors and variables with a P-value of <0.2 and entered the multivariable forward stepwise logistic model. All statistical tests with a 95% confidence interval and P value less than 0.05 were considered statistically significant. Data analysis was performed using Stata version 14.1 software (Stata Corp, College Station, TX, USA).

The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part are appropriately investigated and resolved. The Ethics Committee approved this study of the Kermanshah University of Medical Sciences (IR.KUMS.REC.1399.1163).

Results

This study was performed over 19 months (from February 22, 2020, to September 22, 2021) in 26 hospitals in Kermanshah province, in western Iran, and 55813 patients were admitted with a diagnosis of COVID-19 (using PCR, CTScan, and clinical signs) were included. Of those presents, 27,200 were women (48.7%), and 28,613 were men (51.3%).

The mean age of hospitalized persons was 49.6±22.9, and the highest mortality occurred at more than 50 years old. 58.9% (32847) of all admitted patients reported contact with an infected

person, and 59.1% (2518) of those who died were exposed to a patient. Of the total mortality, 65.2% (2770) had a positive PCR test, and 46.6% (1986) had CT scans favoring COVID-19 disease. 0.6% (281) of the total hospitalized due to COVID-19 were re-admitted after discharge, of which 0.8% (28) died. The median duration of hospitalization was reported to be four days among all hospitalized individuals.

12.8% (7149) of all patients needed intensive care unit, with a mortality rate of 44.3% (1889) in ICU patients. On the other hand, the findings showed that 37.2% (1587) of the cases in which intubation was performed suffered from mortality. Of the total number of people who died from the disease, 84% (3577) had a Spo2 (oxygen saturation) below 93% (upon arrival). Among the main complaints in patients (respiratory distress, cough, muscle aches, fever, anorexia, headache, vomiting, and nausea), distress respiratory with a high rate (72%) (3067) was reported in people with mortality. In this study, the presence of 6 underlying diseases, including hypertension (HTN), cardiovascular diseases (CVD), diabetes, cancer, lung disease, and chronic kidney disease (CKD) in patients with COVID-19, was analyzed. The prevalence of hypertension was the highest in all patients with coronary artery disease and those with mortality (Table 1).

Table1. Demographic and clinical characteristics of all admitted patients in Kermanshah province hospitals

Variable	Categories	Admitted (n=55813)	Recovered (n=51553)	Death (n=4260)
Sex	Female	27200 (48.7)	25303 (49.0)	1897 (44.5)
	Male	28613 (51.3)	26250 (51.0)	2363 (55.5)
Age, mean± SD		49.6±22.9	48.5± 22.7	64.2 ±20.3
Contact history, n (%)		32847 (58.9)	30329 (58.8)	2518 (59.1)
Positive RTC-PCR test, n (%)		27849 (49.9)	25079 (48.6)	2770 (65.2)
CT finding, n (%)		16306 (29.2)	14320 (27.8)	1986 (46.6)
Re-admitted, n (%)		281 (0.6)	253 (0.6)	28 (0.8)
Hospital stays, median (IQR)		4 (1-6)	4 (1-6)	4 (1-8)
ICU admission, n (%)		7149 (12.8)	5260 (10.2)	1889 (44.3)
Intubation, n (%)		3213 (5.8)	1626 (3.1)	1587 (37.2)
SPO2 < 93, n (%)		31539 (56.5)	27962 (54.2)	3577 (84.0)
Temperature mean± SD		37.2 ±1.0	37.2 ± 0.9	37.1 ±2.2
Breathing rate, n (%)	<14	202 (0.5)	65 (0.1)	137 (4.0)
	14-18	16956 (36.5)	15866 (36.9)	1090 (31.7)
	18-22	27828 (60.0)	25765 (60.0)	2063 (59.9)
	>22	1410 (3.0)	1258 (2.9)	152 (4.4)
Chief complaint, n (%)	Distress	32504 (58.2)	29437 (57.1)	3067 (72.0)
	Cough	23551 (42.2)	22182 (43.0)	1369 (32.1)
	Muscular pain	15876 (28.4)	14940 (29.0)	936 (22.0)
	Fever	15060 (27.0)	14224 (27.6)	836 (19.60
	Anorexia	5223 (9.6)	4926 (9.8)	297 (7.0)
	Headache	3821 (7.0)	3690 (7.4)	131 (3.1)
	Vomit	2506 (4.6)	2385 (4.7)	121 (2.9)
	Nausea	2465 (4.5)	2384 (4.7)	81 (1.9)
Comorbidity, n (%)	HTN	6389 (11.4)	5584 (10.8)	805 (18.9)
	CVD	3514 (6.3)	3058 (5.9)	456 (10.7)
	Diabetes	3460 (6.2)	3013 (5.8)	447 (10.5)
	Cancer	767 (1.4)	643 (1.2)	124 (2.9)
	Lung diseases	1218 (2.2)	1092 (2.1)	126 (3.0)
	CKD	610 (1.1)	480 (0.9)	130 (3.0)
	Other *	2836 (5.1)	2488(4.8)	348 (8.2)

*Other means chronic liver disease, Chronic blood diseases, HIV/AIDS, Chronic neurological diseases, Immunodeficiency, Tuberculosis (TB), End-Stage Renal Disease (ESRD), hyperlipoproteinemia (HLP), Thyroid disease, Amorism, Depression, Alzheimer, Parkinson, Thalassemia, …

In this study, after a general examination of the entire community with COVID-19 admitted (55813 patients) in hospitals of Kermanshah province, patients with the underlying disease were statistically analyzed separately and evaluated from various aspects. Of the six underlying

diseases, mortality was higher in women with HTN and diabetes than men. Patients with HTN had the highest history of contact with an infected person (54.7%), and among deaths with underlying causes, death due to HTN showed the highest history of contact (56%). The maximum incidence and uppermost mortality rate in people with positive PCR tests and CT findings in favor of coronavirus in their medical records were reported in HTN underlying disease (Table 1).

CKD had the highest readmission and peak mortality in this category. Most hospital stays were reported in people with HTN underlying disease. Among these people, the maximum number of ICU patients was related to the underlying CVD disease, and the highest intubation and mortality were shown in people with CKD. Respiratory distress had the uppermost percentage of complaints in all of the above underlying diseases. Among all these people who suffered from mortality, respiratory distress had the highest percentage of complaints (Table 2).

Table 2. Characteristics of patients with underlying diseases

Variable	Categories	HTN		CVD		Diabetes		Cancer		Lung diseases			
		Admitted	Death	Admitted	Death	Admitted	Death	Admitted	Death	Admitted	Death	Admitted	Death
Sex	Female	3774 (59.1)	447 (55.5)	1737 (49.4)	223 (48.9)	2046 (59.1)	260 (58.2)	378 (49.3)	48 (38.7)	628 (51.6)	63 (50.0)	274 (44.9)	59 (45.4)
	Male	2615 (40.9)	358 (44.5)	1777 (50.6)	233 (51.1)	1414 (40.8)	187 (41.8)	389 (50.7)	76 (61.3)	590 (48.4)	63 (50.0)	336 (55.1)	71 (54.6)
Age, mean± SD		65.6±15.4	70.4± 14.5	66.2±16.2	70.1± 17.1	62.6± 15.4	67.2± 14.8	52.7± 23.0	62.6 ± 15.8	61.1 ± 19.7	66.7 ±18.9	62.3± 18.6	64.8±17.6
ICU admission, n (%)		1070 (16.7)	334 (41.5)	1059 (30.1)	217 (47.6)	624 (18.0)	208 (46.5)	170 (22.2)	68 (54.9)	243 (19.9)	58 (46.0)	167 (27.4)	72 (55.4)
Intubation, n (%)		693 (10.8)	310 (38.5)	371 (10.6)	219 (48.0)	316 (9.1)	177 (39.6)	82 (10.7)	51 (41.1)	124 (10.2)	62 (49.2)	76 (12.5)	55 (42.3)
Contact history, n (%)		3497 (54.7)	451 (56.0)	1308 (37.2)	190 (41.7)	1686 (48.7)	234 (52.3)	267 (34.8)	54 (43.5)	428 (35.2)	50 (39.7)	226 (37.0)	55 (42.3)
Positive RTC-PCR test , n (%)		3657 (63.3)	567 (73.4)	1441 (45.0)	263 (60.2)	1934 (61.8)	304 (71.8)	257 (35.7)	58 (48.3)	450 (42.3)	70 (59.3)	232 (42.1)	73 (58.9)
CT finding, n (%)		2317 (71.1)	377 (72.8)	1163 (56.2)	180 (60.4)	1225 (65.2)	205 (70.9)	259 (50.3)	59 (64.1)	438 (54.5)	48 (53.9)	257 (60.0)	62 (60.8)
Re-admitted, n (%)		54 (0.1)	6 (0.9)	55 (2.0)	8 (2.1)	42 (1.5)	7 (1.8)	6 (1.1)	1 (1.2)	8 (1.0)	1 (1.1)	13 (2.9)	3 (2.9)
Hospital stays, median (IQR)		4 (2-7)	5 (1-9)	3 (2-6)	3 (1-7)	4 (2-7)	4 (1-9)	3 (1-5)	2 (1-6)	3 (1-6)	3 (1-7)	3 (2-6)	3 (1-7)
SPO2 < 93, n (%)		4240 (66.4)	668 (83.0)	2164 (61.6)	387 (84.9)	2208 (63.8)	365 (81.7)	373 (48.6)	93 (75.0)	762 (62.6)	105 (83.3)	390 (63.9)	105 (80.8)
Temperature, mean± SD		37.3±1.1	37.3± 2.1	37.1±1.1	36.8± 2.8	37.1± 0.7	37.0 ± 1.1	37.3±0.6	37.1± 0.5	37.2 ±1.4	36.8 ±3.9	37.2± 0.6	37.0±0.6
Chief compliant, n (%)	Distress	3767 (59.0)	525 (65.2)	2117 (60.2)	327 (71.7)	2057 (49.4)	311 (69.6)	384 (50.1)	85 (68.5)	871 (71.5)	92 (73.0)	370 (60.7)	90 (69.2)
	Cough	2929 (45.8)	340 (42.2)	1367 (38.9)	146 (32.0)	1389 (40.1)	133 (29.7)	263 (34.3)	30 (24.2)	535 (43.9)	39 (30.9)	193 (31.6)	35 (26.9)
	Muscular pain	2219 (34.7)	273 (33.9)	870 (24.8)	86 (18.9)	941 (27.2)	103 (23.0)	129 (16.8)	20 (16.1)	255 (20.9)	22 (17.5)	151 (24.7)	30 (23.1)
	Fever	1619 (25.3)	197 (24.5)	832 (23.7)	85 (18.6)	877 (25.3)	86 (19.2)	239 (31.2)	28 (22.6)	289 (23.7)	31 (24.6)	159 (26.1)	19 (14.6)
	Anorexia	802 (12.6)	94 (11.7)	422 (12.3)	58 (12.8)	355 (10.4)	29 (6.5)	91 (12.4)	19 (15.7)	113 (9.8)	11 (8.8)	73 (12.3)	14 (11.0)
	Headache	564 (8.9)	31 (3.9)	283 (8.3)	20 (4.4)	310 (9.2)	13 (2.9)	43 (5.9)	7 (5.8)	96 (8.5)	6 (4.8)	37 (6.4)	4 (3.1)
	Vomit	438 (6.9)	46 (5.7)	251 (7.3)	32 (7.1)	212 (6.2)	17 (3.82)	50 (6.8)	6 (5.0)	81 (7.0)	4 (3.2)	47 (7.9)	8 (6.2)
	Nausea	340 (5.4)	25 (3.1)	185 (5.4)	16 (3.5)	183 (5.4)	13 (2.9)	38 (5.2)	3 (2.5)	64 (5.6)	4 (3.2)	34 (5.7)	7 (5.5)

Of every 100 patients with COVID-19 admitted to Kermanshah hospitals, men had the highest mortality rate, with the highest number of deaths reported in the age range over 50 years. Among people with coronavirus with underlying diseases, the maximum case fatality rate was reported in people with CKD, cancer, diabetes, CVD, HTN, and lung diseases, respectively (Table 3).

Table 3. Mortality and case fatality rate per 100 admissions in Kermanshah province hospitals by sex, age and underlying disease

Variable	Categories	Death	Hospitalized patients	In Hospital Mortality Rate (per 100 person)
Sex	**Female**	1897 (44.5)	27200 (52.8)	6.97
	Male	2363 (55.5)	28613 (55.5)	8.25
Age	**<50**	753 (17.7)	25628 (49.7)	2.93
	>=50	3507 (82.3)	30185 (58.6)	11.61
CKD		130 (3.1)	610 (1.2)	21.31
Cancer		124 (2.9)	767 (1.5)	16.16
Diabetes		447 (10.5)	3460 (6.7)	12.91
CVD		456 (10.7)	3514 (6.8)	12.70
HTN		805 (18.9)	6389 (12.4)	12.60
Lung diseases		126 (3.0)	1218 (2.4)	10.34
Overall Mortality Rate		4260	51553	7.63

Men were 1.23 times more likely to die than women. Furthermore, the chance of death increased.

1.03 times per year with increasing age. Patients admitted to the ICU were 4.62 times more likely to die, and patients who were intubated were 10.58 times further possible to die. Among the clinical symptoms of coronavirus, people with respiratory distress had a 1.43-fold higher chance of mortality, with the highest chance of death being reported, among other symptoms. CKD had the maximum chance of mortality among the underlying diseases compared to others, with cancer patients in second place. Individuals with underlying CKD disease and cancer had the lowest number of patients compared to the other 4 cases, but their mortality rate was in the first and second ranks (Table 4).

Table 4. Odds Ratio for death in all patients admitted in hospital

Variable	Categories	Crude OR (95% CI)	Adjusted OR (95% CI)
Sex, male		1.20 (1.12-1.27)	1.23 (1.07- 1.41)
Age		1.03 (1.03- 1.04)	1.03 (1.02- 1.03)
Contact history		1.01 (0.94- 1.07)	-
Positive RTC-PCR test		1.65 (1.54- 1.77)	2.05 (1.76- 2.39)
CT finding		2.80 (2.22- 3.52)	1.77 (1.21- 2.59)
Re-admitted		1.38 (0.93- 2.04)	-
Hospital stays		1.04 (1.04- 1.05)	1.00 (0.99- 1.01)
ICU admission		7.01 (6.55- 7.49)	4.62 (3.95-5.41)
Intubation		18.23 (16.83- 19.73)	10.58 (8.89- 12.60)
SPO2 < 93		4.14 (4.06- 4.80)	2.87 (2.38- 3.45)
Temperature		0.91 (0.89- 0.93)	0.88 (0.74- 1.03)
Chief compliant	Distress	1.93 (1.80- 2.06)	1.43 (1.21- 1.68)
	Cough	0.63 (0.58- 0.67)	0.76 (0.65- 0.89)
	Muscular pain	0.69 (0.64- 0.74)	0.88 (0.74- 1.03)
	Fever	0.64 (0.59- 0.69)	1.14 (0.95- 1.36)
	Anorexia	0.69 (0.61- 0.78)	1.40 (1.07- 0.84)
	Headache	0.40 (0.33- 0.48)	0.53 (0.35-0.81)
	Vomit	0.60 (0.49- 0.71)	1.19 (0.75- 1.90)
	Nausea	0.39 (0.31- 0.49)	0.53 (0.29- 0.96)
Comorbidity	CKD	3.34 (2.75- 4.07)	2.12 (1.38- 3.26)
	Cancer	2.37 (1.95- 2.88)	2.06 (1.25- 3.37)
	Diabetes	1.88 (1.70- 2.09)	1.58 (1.26- 1.98)
	HTN	1.91 (1.76- 2.08)	0.90 (0.75- 1.08)
	CVD	1.90 (1.71- 2.10)	0.88 (0.69- 1.13)
	Lung diseases	1.40 (1.16- 1.69)	0.81 (0.50- 1.31)

Discussion

This study aimed to reduce the mortality of cancer patients with COVID-19 compared to other underlying diseases in Kermanshah, west of Iran.

In the current study, the overall hospital mortality rate of covid was 7.63%, which is different in age, sex, and underlying disease subgroups. The percentage of hospital deaths of Covid was higher in men, age 50 and older, and patients with CKD and cancers. Intubation of the patient, hospitalization in ICU, spo2 below 93, patients with CKD and cancer, positive PCR test, CT findings, patients with diabetes, patients with respiratory distress, male gender, and increasing age are important risk factors for mortality caused by covid 19. Also, cough, headache, and nausea were factors that had a preventive effect on mortality.

The hospital mortality rate in the total population of our study was reported to be 7.63%, which is somewhat consistent with other studies. In a study in Italy, this percentage was 7.2 [9], and in Baqiyatallah Hospital in Tehran, Iran, 8.06% [10]. However, this percentage was in some parts of the world, such as Korea (0.9%) [11] and Fars Province, Iran (2.35%) [12]. The mortality rate was reported to be much lower in this study, compared with 11.7% [13] and 16.7% [14] in two studies at Wuhan Hospital in China. The cause of this difference in mortality rate can be attributed to the time of study, the peak of the disease, and the population included in the study.

A study has reported that cancer patients with covid-19 have a higher mortality rate. Factors associated with increased risk of death in these patients include older age, history of smoking, underlying diseases, and active cancer [15]. A two-month study in Istanbul hospitals showed that among 4,489 hospitalized patients due to Covid-19, 77 people had cancer. The results reported that patients with cancer (23.9%) have a higher mortality rate than patients without cancer (1.51%) [16]. Another study in Chinese hospitals was in line with our study and showed that the mortality rate is higher in patients with covid-19 with underlying cancer disease [17].

In most of the COVID-19 studies [12, 14, 18] , as well as ours, men had the highest rates of morbidity and mortality, which could be due to female hormones [19]. However, some studies have shown that women's morbidity and mortality are higher due to pregnancy [13, 20, 21]. Mortality in this study was seen at a mean age of 64.2. In countries such as Italy [9], Korea [22], and China [18], this age range refers to over 70 years and even more than 80 years. This can be justified in Italy, where 23% of the population is elderly. Decreased immune system ability in old age can be one of the reasons for increased mortality in the elderly and the high prevalence of underlying diseases [23].Old age has been reported as an important cause of mortality in SARS [22].

Older age is a significant risk factor in increased mortality from SARS, MERS, and COVID-19[24-26]. The Centers for Disease Control and Prevention (CDC) reports that people over 65 account for 31% of all cases of COVID-19, as well as 45% of hospitalizations and 80% of deaths from COVID-19[27]. As our study also showed, the mortality rate increases with age.

The logistic regression results reported a significant relationship between underlying diseases and patient mortality. As other studies have reported, poor results there is in patients with coronavirus with underlying diseases [28]. Among people with COVID-19 with underlying diseases, the highest mortality rates were reported in people with CKD, cancer, diabetes, CVD, HTN, and lung diseases. Most HTN studies have the maximum death percentage among the underlying diseases [11, 18]. Diabetes, CVD, and CKD are other cases with a high percentage of mortality [9, 10, 12], and cancer often ranks second after these diseases [13].

In other studies, mortality from COVID-19 in cancer patients is between 9% and 50%. The results of the present study are at the end of this spectrum, with a mortality of 16.6% [4, 29-35].

In one year (2020) in the United States, 507,307 patients with and without cancer were studied. Regardless of the recent treatment received, patients with cancer were more likely to have complications than patients without cancer. A higher risk of death and ICU stay was observed in patients with recent cancer treatment. The mortality rate was higher in patients whose cancer had metastasized. Patients recently receiving chemotherapy or radiotherapy also reported worse outcomes [36]. A large sample size better evaluates cancer-specific outcomes in Covid-19, which was reported in line with our study.

A UK study of 800 cancer patients who also contracted Covid-19 showed that mortality from COVID-19 in cancer patients was mainly due to age, gender, and co-morbidities. They found no evidence that cancer patients receiving chemotherapy or other anticancer treatments were at increased risk of death from Covid-19 compared to patients not receiving active treatment [37].

COVID-19 corticosteroid therapy is not ineffective in increasing mortality by reducing immune resistance [38]. Therefore, using this class of drugs with more caution seems necessary.

The present study was conducted with a large sample size in all hospitals of a province over a wide period. Although the study volume is great and is one of its benefits, unfortunately, due to the problems caused by the high number of referrals to medical centers in several disease peaks, there was no accurate record of patient information such as cancer type in the file. This study included only inpatients and did not include outpatients with mortality. Future studies can compensate for these limitations.

Conclusion

The important points in this study were that the people under research were selected from the same region and formed a homogeneous community regarding underlying diseases and other variables. Aging, male gender, and underlying disease were the main causes of increased mortality in COVID-19 disease in hospitals of Kermanshah province. CKD and cancer reported the highest mortality rate among underlying diseases due to COVID-19. These findings reinforce the demand for individualized strategies for managing different types of cancer that decrease the risk of death from COVID-19. Attention to more health care should be on the serious agenda of coronavirus treatment protocols.

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