



Epidemiological and Clinical Characteristics of COVID-19 Inpatients and Potential Risk Factors for Mortality in Zahedan, Iran: A Multicenter Study

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Abstract

Background: The coronavirus disease 2019 (COVID-19) pandemic is an emerging global threat to public health.

Objectives: This study examined the epidemiological and clinical characteristics and death-related factors of COVID-19 in inpatients in Zahedan, Iran.

Methods: This multicenter study included all COVID-19 patients admitted to Zahedan hospitals within February to April 2020. Demographic, epidemiological, and clinical characteristics were extracted from medical records. Bivariate and multivariate logistic regression models were used to examine the risk factors associated with inpatient mortality.

Results: Of 425 patients in this study, 237 and 188 were male and female, respectively. Moreover, 31 (7.29%) patients died. The patients with a severe stage of pneumonia and those with a severe/critical condition of COVID-19 were 35.8% and 35.1%, respectively. The most prevalent symptoms were cough (70.8%), shortness of breath (62.1%), fever (34.1%), bruising (28.7%), and shivering (28.5%). The most prevalent underlying diseases were hypertension (23.3%), diabetes (16.7%), cardiovascular disease (13.2%), chronic pulmonary disease (9.6%), and asthma (5.4%). Adjusted odds ratio (OR) of in-hospital mortality increased for patients with older age (OR = 3.74, 95% CI: 1.39 - 10.32), at least one underlying disease (OR = 1.16, 95% CI: 1.01 - 1.32), severe disease (OR = 30.9, 95% CI: 4.01 - 239.09), and critically severe disease (OR = 736.5, 95% CI: 74.75 - 7256.1) compared to mild/moderate disease.

Conclusions: This study showed that older age, disease severity, and underlying diseases were mortality risk factors due to COVID-19 infection. This finding indicates that priorities for hospital admission must be given to patients with a higher risk of mortality due to limited facilities, especially in less privileged areas.

Keywords: COVID-19, Patients, Risk Factors, Mortality

1. Background

Coronavirus disease 2019 (COVID-19) is an emerging disease that started in China in December 2019 and is still a global health challenge (1). The clinical presentations of the virus are different depending on the mild or severe disease (2). COVID-19 has been declared an epidemic by the World Health Organization (WHO). The case fatality ratio of COVID-19 has been reported from 2% to 7.2%, with a

higher risk for older adults with underlying diseases (3-6); however, it is dissimilar in different countries. The causes of fatality in COVID-19 have not been identified. However, some reported risk factors of mortality in COVID-19 patients are older age (7), late screening of critically ill patients and late intervention (8), other underlying diseases, secondary infections, elevated inflammatory indicators in the blood (9), and multiple comorbidities

(6).

The evidence has shown that epidemiological and clinical characteristics of COVID-19 patients are the potential risk factors for mortality. Comorbidities were current in nearly half of the patients, with hypertension being the most common comorbidity, followed by diabetes and coronary heart disease (7). Additionally, the most communal symptoms on admission were fever and cough, followed by sputum production and fatigue (7). A study at Zahedan University of Medical Sciences, Zahedan, Iran, has shown that respiratory failure, acute respiratory distress, sepsis, heart failure, and acute kidney and liver injury were related to the severity and mortality of COVID-19 (8). However, these findings are based on the information acquired during the epidemic's first three months in limited countries. The expectation is that the mortality pattern of COVID-19 and related risk factors change over time due to its nature. Therefore, it is essential to assess the disease mortality risk factors in different countries and periods.

The disadvantaged regions of Sistan and Balochistan lie in southeastern Iran, bordering Pakistan and Afghanistan, and have weak surveillance systems. The present study hypothesized that considering cultural and social differences, the features and risk factors of COVID-19 mortality dissimilar to other regions and familiarity with these differences are useful for disease management.

To the best of our knowledge, the current study is the first investigation to examine patients' characteristics with COVID-19 in Zahedan. Identifying the risk factors of mortality and clinical features of COVID-19 can help clinicians better manage and effectively prioritize resources for the highest-risk patients (9).

2. Objectives

This study aimed to identify the potential risk factors of mortality in patients and describe the epidemiological and clinical characteristics of hospitalized patients.

3. Methods

3.1. Study Design

This study investigated 425 COVID-19 patients with a definite outcome (dead or discharged) admitted to all hospitals affiliated with Zahedan University of Medical Sciences. All patients diagnosed with COVID-19 conforming to the WHO interim guidance (10) were enrolled in the study between February 29, 2020, and April 31, 2020. Ethical approval was obtained from Zahedan University of Medical Sciences (IR.ZAUMS.REC.1399.020).

Written informed consent was obtained from the patients or their relatives.

3.2. Diagnostic Criteria for COVID-19

The detection of COVID-19 in throat swab samples was performed through real-time reverse transcription polymerase chain reaction. According to the WHO guidance for the clinical management of COVID-19, this study classified symptomatic patients without signs of viral pneumonia or hypoxia, patients with clinical signs of pneumonia but no severe pneumonia symptoms, and patients with oxygen support as mild, moderate, and critical ill, respectively (10). In addition, the age of over 12 years and habitation in Zahedan were the inclusion criteria.

3.3. Data Collection

Demographic, epidemiological, and clinical characteristics were extracted from medical records. Complementary data were collected through interviews with patients or their relatives.

3.4. Statistical Analysis

Frequency and percentage were used to describe the categorical variables. In addition, mean, and standard deviation were employed to express continuous variables. The independent sample *t*-test, χ^2 test, or Fisher's exact test were used to compare the differences between survivors and nonsurvivors regarding epidemiological and clinical factors and underlying diseases. The univariate logistic regression model was used to explore the risk factors associated with in-hospital mortality, and an odds ratio (OR) and 95% confidence interval were reported. Considering the total number of mortalities, the exact logistic regression was used for the multiple models due to the small number of mortalities ($n = 31$). For bias reduction, the hospital's cases and controls were selected from the same groups. In addition, the multivariate model was used for this purpose. Variables were excluded from the univariate analysis if the inter-group differences were not significant, when their accuracy was unconfirmed, or if there were very few events to calculate OR. The data were analyzed in Stata software (version 16), and α less than 0.05 (two-tailed) was considered statistically significant.

4. Results

4.1. Baseline Characteristics

Of the 425 patients, 55.8% and 38.6% were male and older than 50 years, respectively. The mean age of the patients was 45.05 ± 17.38 years (range: 10 - 92 years). In

this study, 9.2% and 3.8% of the patients reported substance abuse and cigarette smoking, respectively. Furthermore, 13.6% of the patients traveled to high-risk areas in the last 2 weeks. Moreover, 12.2% of the patients visited a medical care center within 2 weeks before the onset of symptoms, and 11.5% reported close contact with a respiratory patient. The percentages of contacts with respiratory patients at medical centers, family members, and workplaces were 5.9%, 9.6%, and 2.6%, respectively. About 4% of the patients reported close contact with a COVID-19 patient 2 weeks before the onset of symptoms. Additionally, 41.4% of the patients used a face mask, and 54.7% personally visited a medical center.

4.2. Mortality and Associated Risk Factors

There was a significant association between patient age and mortality. The chance of mortality was 4.34 times higher in patients aged more than 50 years than those under 50 years. The patients referred to the hospital by ambulance (OR = 4.94), or other means (OR = 17.62) were more likely to die than those who went to the hospital personally (Table 1).

On admission, 37.2% of the patients had a temperature > 37.5, 35.8% were in the severe stage of pneumonia, and 35.1% had severe/critical conditions of COVID-19. The most prevalent symptoms were cough (70.8%), shortness of breath (62.1%), fever (34.1%), bruising (28.7%), and shivering (28.5%). There was an abnormal finding in 94.6% of patients' chest computed tomography. The univariate analysis showed that pneumonia, disease severity, body temperature, loss of consciousness, and seizure were significantly related to mortality among COVID-19 patients. Compared to patients with mild/moderate pneumonia, the odds of mortality were higher in patients with severe (OR = 16.09) and critically ill (OR = 89.67) levels of pneumonia. For patients with a temperature of higher than 38.5°C, the odds of mortality were 3.65 times higher. The chance of mortality was higher in patients with seizures (OR = 27.1) and loss of consciousness (OR = 7.27) (Table 2). Diarrhea (4.9%), sore throat (5.9%), and runny nose (1.4%) were not significantly different between survivors and nonsurvivors ($P > 0.05$).

The univariate analysis showed that complications arising during treatment, including acute respiratory distress syndrome, sepsis, respiratory failure, acute heart injury, heart failure, acute kidney injury, ventilator pneumonia, and acidosis, had a significant relationship with mortality among COVID-19 patients. The chance of mortality was higher in patients with sepsis (OR = 26.22), respiratory failure (OR = 145.08), acute respiratory distress syndrome (OR = 30.79), heart failure (OR = 11.53), acute heart injury (OR = 19.31), acute kidney injury (OR = 14.24),

acidosis (OR = 94.32), and ventilator pneumonia (OR = 27.1) (Table 2). Only one patient developed seizures and arrhythmia.

In this study, the most prevalent underlying conditions were hypertension, diabetes, cardiovascular disease, chronic pulmonary disease, and asthma, respectively. Underlying conditions, such as dialysis (OR=6.34) and cerebrovascular disease (OR = 6.93), increased the chance of mortality (Table 3). Furthermore, only 2 (0.5%) patients had congestive heart disease and malignancy.

Of all patients admitted to the hospital, 36.9% had an oxygen saturation > 0.93%, 11.5% were admitted to the intensive care unit (ICU), and 8.7% underwent mechanical ventilation. Moreover, 90.6% and 8.2% of the patients underwent high-flow nasal cannulas and invasive mechanical ventilation, respectively. Admission to the ICU increased the odds of mortality (OR = 111.14). Oxygen saturation of more than 0.93% could prevent patients from dying by 77%. The mean heart rate and the respiratory rate were significantly different between COVID-19 survivors and nonsurvivors ($P < 0.001$) (Table 4). It should be mentioned that most patients took antibiotics (93.6%) and antiviral drugs (96.9%). However, taking such drugs was not related to survival among COVID-19 patients ($P < 0.05$).

Multivariate regression showed increased odds of mortality associated with older age (OR = 3.74), having at least one underlying disease (OR = 1.16), and severity of COVID-19 (OR = 30.9 and OR = 736.5 for severe and critically ill patients compared to mild/moderate patients, respectively) (Table 5).

5. Discussion

The present study generally provides a comprehensive explanation of the clinical specifications of laboratory-confirmed COVID-19 patients and the risk factors for severe COVID-19. Additionally, the study investigated the clinical characteristics of 425 patients hospitalized with COVID-19 and potential risk factors of mortality in a deprived region in Iran. Univariate analysis revealed that age, means of transportation to a hospital, pneumonia severity, disease severity, fever (temperature higher than 38.5°C), seizures, loss of consciousness, sepsis, acute respiratory distress syndrome, and respiratory failure had a significant relationship with mortality in COVID-19 patients. Moreover, acute heart injury, heart failure, acute kidney injury, ventilator-associated pneumonia, dialysis, acidosis, cerebrovascular disease, ICU admission, mechanical ventilation, invasive mechanical ventilation, heart rate, and respiratory rate had a significant relationship with mortality in COVID-19

Table 1. Demographic and Epidemiological Characteristics of Coronavirus Disease 2019 Survivors and Nonsurvivors in the Southeast of Iran ^a

Demographic and Epidemiological Characteristics	Total	Mortality	OR (95% CI)
Age (y)			
Over 50	164 (38.6)	22 (13.4)	4.34 (1.94 - 9.68) ^b
Under 50	261 (61.4)	9 (3.4)	1.00
Gender			
Male	237 (55.8)	18 (7.6)	1.11 (0.53 - 2.32) ^c
Female	188 (44.2)	13 (6.9)	1.00
Substance abuse			
No	386 (90.8)	29 (7.5)	1.50 (0.34 - 6.55) ^c
Yes	39 (9.2)	2 (5.1)	1.00
Travel to high-risk areas			
No	367 (86.4)	29 (7.9)	2.40 (0.56 - 10.35) ^c
Yes	58 (13.6)	2 (3.4)	1.00
Visiting a medical care center within 2 weeks before the onset of symptoms			
No	373 (87.8)	29 (7.8)	2.11 (0.49 - 9.11) ^c
Yes	52 (12.2)	2 (3.8)	1.00
Close contact with a respiratory patient within 2 weeks before the onset of symptoms			
No	376 (88.5)	28 (7.4)	1.23 (0.36 - 4.1) ^c
Yes	49 (11.5)	3 (6.1)	1.00
Close contact with a respiratory patient within 2 weeks before the onset of symptoms in medical centers			
No	400 (94.1)	29 (7.3)	1.00
Yes	25 (5.9)	2 (8.0)	1.11 (0.25 - 4.95) ^c
Close contact with a respiratory patient within 2 weeks before the onset of symptoms in the family or workplace			
No	384 (90.4)	27 (7.0)	1.00
Yes	41 (9.6)	4 (9.8)	1.43 (0.47 - 4.31) ^c
Unknown close contact with a respiratory patient within 2 weeks before the onset of symptoms			
No	138 (32.5)	12 (8.7)	1.00
Yes	287 (67.5)	19 (6.6)	0.74 (0.35 - 1.58) ^c
History of close contact with a COVID-19 patient within 2 weeks before the onset of symptoms			
No	408 (96.0)	28 (6.9)	1.00
Yes	17 (4.0)	3 (17.6)	2.91 (0.79 - 10.72) ^c
History of close contact with a suspected COVID-19 patient within 2 weeks before the onset of symptoms			
No	395 (92.9)	30 (7.6)	1.00
Yes	30 (7.1)	1 (3.3)	0.42 (0.06 - 3.19) ^c
Using mask protection			
No	249 (58.6)	15 (6.0)	1.00
Yes	176 (41.4)	16 (9.1)	1.56 (0.75 - 3.24) ^c
How transferred to a medical center			
Personally	231 (54.7)	2 (0.9)	1.00
By ambulance	86 (20.4)	14 (16.3)	22.2 (4.9 - 100.2) ^d
By others	105 (24.9)	14 (13.3)	17.6 (3.9 - 79.06) ^d

Abbreviations: OR, odds ratio; CI, confidence interval; COVID-19, coronavirus disease 2019.

^a Values are expressed as No. (%) unless otherwise indicated.^b Significant at P < 0.05.^c Not significant.^d Significant at P < 0.01.

Table 3. Distribution of Underlying Diseases Among Coronavirus Disease 2019 Survivors and Nonsurvivors in the Southeast of Iran ^a

Underlying Disease	Total	Mortality	OR (95% CI)
Dialysis			
No	412 (96.9)	27 (6.6)	1.00
Yes	13 (3.1)	4 (30.8)	6.34 (1.83 - 21.92) ^b
Cardiovascular disease			
No	369 (86.8)	28 (7.6)	1.00
Yes	56 (13.2)	3 (5.4)	0.69 (0.20 - 2.35) ^c
Diabetes			
No	354 (83.3)	26 (7.3)	1.00
Yes	71 (16.7)	5 (7.0)	0.96 (0.35 - 2.58) ^c
Liver disease			
No	417 (98.1)	30 (7.2)	1.00
Yes	8 (1.9)	1 (12.5)	1.84 (0.22 - 15.48) ^c
Chronic kidney disease			
No	411 (96.7)	28 (6.8)	1.00
Yes	14 (3.3)	3 (21.4)	3.73 (0.98 - 14.15) ^c
Chronic neurological disease			
No	416 (97.9)	30 (7.2)	1.00
Yes	9 (2.1)	1 (11.1)	1.61 (0.20 - 13.29) ^c
Chronic lung disease			
No	384 (90.4)	28 (7.3)	1.00
Yes	41 (9.6)	3 (7.3)	1.00 (0.29 - 3.46) ^c
Hypertension			
No	326 (76.7)	25 (7.7)	1.00
Yes	99 (23.3)	6 (6.1)	0.78 (0.31 - 1.95) ^c
Cerebrovascular disease			
No	416 (97.9)	28 (6.7)	1.00
Yes	9 (2.1)	3 (33.3)	6.93 (1.64 - 29.18) ^b
Chronic blood disease			
No	417 (98.1)	30 (7.2)	1.00
Yes	8 (1.9)	1 (12.5)	1.84 (0.22 - 15.48) ^c
Asthma			
No	402 (94.6)	28 (7.0)	1.00
Yes	23 (5.4)	3 (13.0)	2.00 (0.56 - 7.15) ^c
Rheumatologic disease			
No	412 (96.9)	29 (7.0)	1.00
Yes	13 (3.1)	2 (15.4)	2.40 (0.51 - 11.35) ^c
Organ transplant			
No	423 (99.5)	30 (7.1)	1.00
Yes	2 (0.5)	1 (50.0)	13.10 (0.80 - 214.68) ^c
Defect immune system			
No	412 (96.9)	29 (7.0)	1.00
Yes	13 (3.1)	2 (15.4)	2.40 (0.51 - 11.35) ^c

Abbreviations: OR, odds ratio; CI, confidence interval.

^a Values are expressed as No. (%) unless otherwise indicated.^b Significant at $P < 0.05$.^c Not significant.

patients. Multivariate analysis revealed that age, disease severity, and underlying diseases were predictors of mortality in COVID-19 patients.

In this study, in-hospital mortality was 7.29%, and the odds of mortality were significantly greater in patients over 50 years. Other studies have reported

Table 4. Distribution of Oxygen Therapy and Vital Signs in Coronavirus Disease 2019 Survivors and Nonsurvivors in the Southeast of Iran ^a

Indices		Total	Mortality	OR (95% CI)
High-flow nasal cannula	No	40 (9.4)	26 (65.0)	1.00
	Yes	385 (90.6)	5 (1.3)	0.007 (0.002 - 0.021) _b
Non-invasive mechanical ventilation	No	417 (98.1)	29 (7.0)	1.00
	Yes	8 (1.9)	2 (25.0)	4.46 (0.86 - 23.09) ^c
Invasive mechanical ventilation	No	390 (91.8)	2 (0.5)	1.00
	Yes	35 (8.2)	29 (82.9)	937.6 (181.1 - 4854.09) _b
Intensive care unit admission	No	376 (88.5)	4 (1.1)	1.00
	Yes	49 (11.5)	27 (55.1)	114.14 (36.70 - 355.0) ^b
Oxygen saturation	≤ 0.93	267 (63.1)	27 (10.1)	1.00
	> 0.93	156 (36.9)	4 (2.6)	0.23 (0.08 - 0.68) ^b
Vital Signs		Nonsurvivors	Survivors	P-Value
Heart rate	< 0.001	107.6 ± 19.9	93.1 ± 14.5	< 0.001
Respiratory rate	< 0.001	26.6 ± 9.12	19.5 ± 4.6	< 0.001
Systolic blood pressure	0.655	118.4 ± 23.6	116.4 ± 16.8	0.655 ^c
Diastolic blood pressure	0.462	75.0 ± 14.0	73.3 ± 11.1	0.462 ^c

Abbreviations: OR, odds ratio; CI, confidence interval; SD, standard deviation.

^a Values are expressed as No. (%) or mean ± SD unless otherwise indicated.

^b Significant at P < 0.01.

^c Not significant.

Table 5. Multivariate Exact Logistic Regression to Determine Predictors of Survival in Coronavirus Disease 2019 Patients in the Southeast of Iran

Independent Variables	B	Standard Error of Beta	OR (95% CI)	P-Value
Age (y)		0.51	3.74 (1.39 - 10.32)	0.011
> 50	1.32			
≤ 50	1			
Having at least one underlying disease		0.07	1.16 (1.01 - 1.32)	0.032
Yes	0.14			
No	1			
History of close contact with COVID-19 patients		0.38	8.07 (3.80-17.14)	0.001
Yes	2.08			
No	1			
Severity				
Critically ill	6.60	1.16	736.5 (74.75 - 7256.1)	0.001
Severe	3.43	1.04	30.97 (4.01 - 239.09)	0.001
Mild/moderate	1	1	1	

Abbreviations: OR, odds ratio; CI, confidence interval; COVID-19, coronavirus disease 2019.

different in-hospital mortality rates of 25.7%, 17%, and 3.77% (11-13), which might be due to differences in the social-demographic composition of different parts of the world (14). Older age has also been identified as a risk factor for the mortality of COVID-19 patients (15),

indicating a lower immune response in older individuals (16).

A history of close contact with COVID-19 patients was associated with mortality in COVID-19 patients in this study, indicating that exposure to confirmed

cases is among the risk factors for severe COVID-19 (17). Ambulance transportation, the severity of pneumonia, and the severity of the disease increased the risk of mortality in COVID-19 patients in the current study. The aforementioned data have a logical justification because severe COVID-19 patients need advanced respiratory services, such as synthetic respiratory services, which cannot be provided inside the ambulance. The aforementioned findings are in line with findings from China indicating the highest case fatality in patients with a critical condition (18). Irregularities in vital signs, including temperature, heart rate, and respiratory rate, were risk factors for mortality in the current study, confirmed by another study (19). Furthermore, this study identified seizure as a risk factor for mortality in COVID-19 patients. Epilepsy patients with COVID-19 might have a high fever, which might cause seizures. Moreover, epilepsy has a significant relationship with mortality in in-hospital patients (20, 21).

According to this study's results, a decreased level of consciousness, hospitalization in the ICU, invasive mechanical ventilation, and ventilation-related pneumonia were risk factors for mortality, similar to other research findings (22). Most critically ill patients in the ICU require invasive mechanical ventilation, and ventilator-associated pneumonia worsens patients' clinical condition, which both increase mortality in COVID-19 patients (23, 24). Furthermore, a high incidence of thrombotic complications in patients with COVID-19 pneumonia admitted to the ICU than in the wards can lead to more venous thromboembolism and death of patients admitted to the ICU (25, 26).

Complications developed during treatment, including sepsis, acute respiratory distress syndrome, respiratory failure, acute heart injury, heart failure, acute kidney injury, and acidosis, were risk factors for mortality in this study. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus can damage organs by affecting the renin-angiotensin system (27). Additionally, SARS-CoV-2 neuroinvasive potential might cause respiratory failure in COVID-19 patients (28). Severe respiratory failure in COVID-19 patients leads to hyper-inflammatory responses with either immune dysregulation or macrophage activation syndrome (29). Moreover, acute respiratory failure results in severe hyper-coagulability (30) associated with mortality due to novel coronavirus pneumonia (31). Cardiac injury in patients with COVID-19 is associated with a higher risk of in-hospital mortality, and inflammation can potentially explain cardiac injury (32, 33). An increased inflammatory burden of SARS-CoV-2 can cause a cardiac event (34). Furthermore, COVID-19 infection can cause ketosis or ketoacidosis, and ketosis, in turn, will increase

mortality (35).

Among comorbidities, cerebrovascular diseases and dialysis were risk factors for mortality in the current study. As mentioned in previous studies, cerebrovascular diseases had a relationship with an increased risk of mortality in COVID-19 patients (36, 37). The reason for the increased severity of COVID-19 in patients with cerebrovascular disease is unclear. It is also important that the association between cerebrovascular disease and poor outcomes in COVID-19 patients is not affected by age, gender, and other underlying conditions (38). Future studies should examine this relationship. In addition, the mortality rate in dialysis patients is higher than in the general population (39). This higher mortality rate in COVID-19 dialysis patients might be related to their age because most COVID-19 dialysis patients are older (40).

5.1. Limitations

This study has a structural limitation. This study was a secondary data analysis using hospital administrative records.

5.2. Conclusions

This study showed that older age, disease severity, and undelaying conditions were associated factors with increased mortality risk in COVID-19 patients. These results might help clinicians identify risk factors associated with the mortality and management of patients with COVID-19, especially in disadvantaged areas where there are few medical facilities available.

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Footnotes

Authors' Contribution: All the authors participated in the conceptualization and design of the study. SMNT, NT, and FAM directed the study's implementation. MM, HA, and HOA analyzed and interpreted the data. HOA, HA, and MK drafted the manuscript. HOA, AAM, and JN revised the manuscript for important intellectual content. All the authors read and approved the final manuscript.

Conflict of Interests: The authors declared that several of the authors (GHM (reviewer, associate editor, and

editorial board), JN (reviewer), FS (reviewer and associate editor), MM (reviewer, associate editor, and editorial board), AAM (reviewer, associate editor, editorial board, and chairman editor), HA (reviewer, associate editor, and editorial board), MK (reviewer, associate editor, editorial board, and managing editor), ST (reviewer), HOA (reviewer, associate editor, and editorial board)), are in the editorial board. The journal confirmed that the mentioned author with conflict of interest (CoI) was completely excluded from all review processes. The authors also introduced this author with CoI during the submission as an opposed reviewer.

Data Reproducibility: The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Ethical Approval: Ethical approval for this study was obtained from the Ethics Committee of Zahedan University of Medical Sciences ([IR.ZAUMS.REC.1399.020](https://doi.org/10.1399.020)).

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Table 2. Clinical Characteristics of Coronavirus Disease 2019 Survivors and Nonsurvivors in the Southeast Iran ^a

Clinical Characteristics on Admission	Total	Mortality	OR (95% CI)
Pneumonia			
Mild/moderate	272 (64.2)	3 (1.1)	1.00
Severe	138 (32.5)	21 (15.2)	16.09 (4.71 - 55.01) ^b
Critically ill	14 (3.3)	7 (50.0)	89.67 (19.09 - 421.08) ^c
Temperature			
≤ 37.5	264 (62.9)	13 (4.9)	1.00
37.5 - 38.5	112 (26.7)	11 (9.8)	2.10 (0.91 - 4.85) ^d
> 38.5	44 (10.5)	7 (15.9)	3.65 (1.37 - 9.75) ^b
Shivering			
No	304 (71.5)	25 (8.2)	1.00
Yes	121 (28.5)	6 (5.0)	0.58 (0.23 - 1.46) ^d
Fever			
No	280 (65.9)	22 (7.9)	1.00
Yes	145 (34.1)	9 (6.2)	0.78 (0.35 - 1.73) ^d
Cough			
No	124 (29.2)	14 (11.3)	1.00
Yes	301 (70.8)	17 (5.6)	0.47 (0.22 - 0.99) ^d
Shortness of breath			
No	161 (37.9)	11 (6.8)	1.00
Yes	264 (62.1)	20 (7.6)	1.12 (0.52 - 2.40) ^d
General weakness			
No	359 (84.5)	26 (7.2)	1.00
Yes	66 (15.5)	5 (7.6)	1.05 (0.39 - 2.84) ^d
Bruising			
No	303 (71.3)	26 (8.6)	1.00
Yes	122 (28.7)	5 (4.1)	0.46 (0.17 - 1.22) ^d
Irritability			
No	422 (99.3)	30 (7.1)	1.00
Yes	3 (0.7)	1 (33.3)	6.53 (0.58 - 74.14) ^d
Nausea			
No	357 (84.0)	28 (7.8)	1.00
Yes	68 (16.0)	3 (4.4)	0.54 (0.16 - 1.84) ^d
Headache			
No	352 (82.8)	28 (8.0)	1.00
Yes	73 (17.2)	3 (4.1)	0.50 (0.15 - 1.68) ^d
Chest pain			
No	413 (97.2)	30 (7.3)	1.00
Yes	12 (2.8)	1 (8.3)	1.16 (0.14 - 9.30) ^d
Abdominal pain			

No	415 (97.6)	30 (7.2)	1.00
Yes	10 (2.4)	1 (10.0)	1.43 (0.18 - 11.63) ^d
Joint pain			
No	401 (94.4)	29 (7.2)	1.00
Yes	24 (5.6)	2 (8.3)	1.17 (0.26 - 5.21) ^d
Abnormal lung sounds			
No	380 (89.4)	27 (7.1)	1.00
Yes	45 (10.6)	4 (8.9)	1.28 (0.42 - 3.83) ^d
Abnormal computed tomography			
No	23 (5.4)	1 (4.3)	1.00
Yes	402 (94.6)	30 (7.5)	1.77 (0.23 - 13.62) ^d
Seizure			
No	422 (99.3)	29 (6.9)	1.00
Yes	3 (0.7)	2 (66.7)	27.10 (2.39 - 307.84) ^b
Lack of appetite			
No	371 (87.3)	27 (7.3)	1.00
Yes	54 (12.7)	4 (7.4)	0.97 (0.34 - 3.04) ^d
Dizziness			
No	407 (95.8)	30 (7.4)	1.00
Yes	18 (4.2)	1 (5.6)	0.74 (0.10 - 5.75) ^d
Loss of consciousness			
No	395 (92.9)	22 (5.6)	1.00
Yes	30 (7.1)	9 (30.0)	7.27 (2.98 - 17.72) ^b
No sign			
No	418 (98.4)	30 (7.2)	1.00
Yes	7 (1.6)	1 (14.3)	2.16 (0.25 - 18.49) ^d
Complications Arising During Treatment^e			
	Total	Death	OR (95% CI)
Sepsis			
No	399 (93.9)	17 (4.3)	1.00
Yes	26 (6.1)	14 (53.8)	26.22 (10.54 - 65.22) ^b
Respiratory failure			
No	389 (91.5)	6 (1.5)	1.00
Yes	36 (8.5)	25 (69.4)	145.08 (49.5 - 424.5) ^b
Acute respiratory distress syndrome			
No	409 (96.2)	21 (5.1)	1.00
Yes	16 (3.8)	10 (62.5)	30.79 (10.22 - 92.81) ^b
Heart failure			
No	416 (97.9)	27 (6.5)	1.00
Yes	9 (2.1)	4 (44.4)	11.53 (2.92 - 45.42) ^b
Coagulopathy			
No	421 (99.1)	30 (7.1)	1.00
Yes	4 (0.9)	1 (25.0)	4.34 (0.44 - 43.05) ^d

Acute heart injury			
No	418 (98.4)	27 (6.5)	1.00
Yes	7 (1.6)	4 (57.1)	19.31 (4.11 - 90.69) ^b
Acute kidney injury			
No	405 (95.3)	22 (5.4)	1.00
Yes	20 (4.7)	9 (45.0)	14.24 (5.34 - 37.96) ^b
Acute liver injury			
No	422 (99.3)	30 (7.1)	1.00
Yes	3 (0.7)	1 (33.3)	6.53 (0.58 - 74.14) ^d
Acidosis			
No	418 (98.4)	25 (6.0)	1.00
Yes	7 (1.6)	6 (85.7)	94.32 (10.93 - 813.99) ^b
Ventilator pneumonia			
No	422 (99.3)	29 (6.9)	1.00
Yes	3 (0.7)	2 (66.7)	27.10 (2.39 - 307.84) ^b
Sepsis			
No	399 (93.9)	17 (4.3)	1.00
Yes	26 (6.1)	14 (53.8)	26.22 (10.54 - 65.22) ^b
Respiratory failure			
No	389 (91.5)	6 (1.5)	1.00
Yes	36 (8.5)	25 (69.4)	145.08 (49.5 - 424.5) ^b
Acute respiratory distress syndrome			
No	409 (96.2)	21 (5.1)	1.00
Yes	16 (3.8)	10 (62.5)	30.79 (10.22 - 92.81) ^b

Abbreviations: OR, odds ratio; CI, confidence interval.

^a Values are expressed as No. (%) unless otherwise indicated.

^b Significant at $P < 0.05$.

^c Significant at $P < 0.01$.

^d Not significant.

^e Complication of treatment.