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Determinants of mortality in elderly patients hospitalized with COVID-19 at Sohar Hospital: A retrospective cross-sectional study

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ABSTRACT

Objectives: This study aimed to determine the factors causing an elevated risk of mortality among the elderly due to SARS-CoV2.

Methods: This is a retrospective cross-sectional study. The population of the study included all adults aged 60 years or older who were admitted at Sohar Hospital with COVID-19 between March 1, 2020, and December 31, 2020. Data was obtained from hospital records with a focus on patients' demographic information and then analysed quantitatively with a focus on descriptive and analytic statistics in the investigation of associations between patient outcomes and the data presented in patient records.

Results: A total of 404 patients were included in this study. The mean age was 72.72 years (SD 8.93). Male patients represented 57.9% of the sample. The most common comorbidities among patients were hypertension (73.1%), diabetes mellitus (55.6%) and heart diseases (29.2%). The most commonly recorded heart diseases included ischemic heart disease, heart failure, valvular heart disease, and arrhythmias. Focusing on the symptoms, the most common were cough (76.2%), fever (72%), shortness of breath (68.6%), poor oral intake (15.4%), and chest pain (14.6%). The mortality rate was 36.4% and the mortality risk was associated with older age (AOR=3.106, p=0.001), male sex (AOR=1.648, p=0.0043), renal diseases (AOR=2.905, p=0.003), dyspnoea (AOR=4.067, p<0.001), altered mental status (AOR=4.242, p=0.002).

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Conclusions: Compared to other age groups, adults over 60 have a higher risk of dying from COVID-19. Higher mortality risk is connected with increasing age, male gender, the prevalence of renal disease, confusion, and dyspnoea in this age group.

Keywords: COVID-19, mortality, Oman, SARS-CoV-2, Sohar Hospital, elderly.

Introduction

Elderly populations have a somewhat high death rate from COVID-19 infection; hence they require special attention. A brand-new coronavirus known as Coronavirus Disease 2019 (COVID-19) has never before been found in humans and causes signs of acute respiratory distress include fever, coughing, and breathing difficulties. Acute respiratory syndrome, renal failure, pneumonia, and even death can be brought on by COVID-19 in extreme situations [(1)].

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) caused the current coronavirus disease 2019 (COVID-19) pandemic and it is characterized by higher infectivity than previously identified coronaviruses, thus, older adults are at a high risk of morbidity and mortality [(2, 3, 4, 5)].

In Oman during the first wave of the pandemic, Al Wahaibi et al. [(6)] performed a retrospective cohort study of PCR-positive COVID-19 cases, about half of their sample population was from the capital city of Muscat and 75% were male, however, adults aged ≥60 years represented a minority. Diabetes mellitus (DM) and hypertension (HTN) were the two most prevalent comorbidities (2.9% and 0.7%, respectively). Fever, cough, and sore throat were the most common symptoms, while 34% of their patients experienced none of these. They discovered a higher risk of hospitalisation, intensive care unit (ICU) admission, and mortality among people over 60, as well as those with morbid obesity or chronic renal disease (CKD). While both diabetes and high blood pressure increased the probability of hospitalisation, only diabetes was linked to an increased risk of ICU admission; neither was linked to an increased risk of death.

Furthermore, Khamis et al. [(7)] investigated 1,304 COVID-19-infected patients, most of them were from Muskat in Oman and 80% of them were males, between late February and mid-April 2020. They found that only 4% were diagnosed with moderate

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or severe COVID-19 based on the World Health Organization (WHO) classifications and the mortality rate was 0.5%, with those aged ≥60 facing a high mortality risk.

In addition, Al-Rawahi et al. [8] investigated COVID-19-positive cases from across Oman (n = 2,443; 80% male) diagnosed between late February and the end of April 2020. The elder age group accounted for 5.5% of the cases, with the majority of cases falling between the ages of 31 and 40. Fever and cough were the most frequently reported symptoms (59% and 55%, respectively) among the cohort's 16%. Some patients (5.5%) complained shortness of breath, 2.0% reported sleeplessness, and 2.4% reported gastrointestinal (GI) issues, while Hypertension (HTN) (21.2%) and diabetes (18%) were the most frequent comorbidities. Finally, the mortality rate was 0.6%.

From early March to 1 December 2020, Khamis et al. (2021) [7] examined 1,002 COVID-19 patients admitted to the Royal Hospital, a tertiary hospital in Muscat. Patients with severe and critical COVID-19 were referred to this hospital, primarily from the Muscat Governorate. The majority of patients were around 50 years old, with the elderly (>60 years) accounting for 29% of the study population. Omani nationals made up 76% of the patients, and 76% of them were men. They did not report the common symptoms when the patients arrived, possibly because they were referred from other hospitals. Only severe and critical cases were admitted, so approximately half of the patients were admitted to the ICU. The in-hospital mortality rate was 26%, with half of the patients being over the age of 60. Diabetes, hypertension, and heart disease were the most common comorbidities (62, 63, and 30%, respectively), while respiratory and liver diseases were uncommon (15 and 4%, respectively). White blood cells (WBC), 8.6 and 6.6 109/L; C-reactive protein (CRP), 1.22 and 1.00 g/L; lactate dehydrogenase (LDH), 511 and 404 U/L; ferritin, 983 and 708 ng/mL were the respective mean laboratory values reported for non-survivors and survivors. Although it was not specified whether infiltrates were detected using chest computed tomography (CT) or chest radiography (CXR), the majority of patients (85%), including 94% of non-survivors, had bilateral lung infiltrates. Steroids were used by 65% of the patients, with non-survivors using them more than survivors (84% and 58%, respectively). Tocilizumab was used in 32% of the patients, more in the non-survivors than survivors

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(51% and 26%, respectively). A high mortality risk was associated with higher age ($p < 0.001$), heart diseases (adjusted odds ratio [AOR], 1.84; 95% confidence interval [CI], 1.11–3.03; $p < 0.018$), liver diseases (AOR, 4.48; 95% CI, 1.04–19.3; $p < 0.044$), high ferritin level (AOR, 1.00; $p < 0.006$), ICU admission (AOR, 2.22; 95% CI, 1.12–4.38; $p < 0.022$), sepsis (AOR, 1.77; 95% CI, 1.12–2.80; $p < 0.022$), and acute respiratory distress syndrome (ARDS; AOR, 3.20; 95% CI, 1.65–6.18; $p < 0.001$).

Although the elderly were affected by Covid 19, the studies that were conducted in this field in the Sultanate of Oman are limited, and no study specifically studied the elderly category, as most studies mentioned the age group only, and so our study came to determine the risk factors for mortality in older adults (≥60 years) admitted to the Sohar Hospital during the first disease wave (March–December 2020).

Methods

This retrospective, cross-sectional, single-centre study included all reverse transcriptase polymerase chain reaction (RT-PCR)-confirmed COVID-19 cases hospitalised in Sohar Hospital, North Batinah Governorate, Oman, between March and December 2020. The EpiInfo software was used to estimate sample size. To get the largest sample size estimation possible, we used an expected prevalence of 50% and a 5% error margin. At a 95% confidence level, the required sample size was 384 patients. This study had 404 patients, which is considered adequate.

As for the inclusion and exclusion criteria, all patients' age ≥ 60 years, COVID-19-positive, and required hospitalization for over 24 hours were included in the study, while patients with missing data and those admitted to a hospital within 30 days before testing positive for COVID-19 were excluded.

Data Collection

Data retrieved from the Sohar Hospital’s electronic health records system included the medical records of patients admitted with COVID-19 during the study period. The collected data did not contain personal or identifying information to protect the patients’ privacy and confidentiality rights.

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Study Variables

The primary outcome measure was the rate of mortality and recorded patient characteristics included age, sex, nationality, travel history, and admission date. We noted clinical characteristics, including comorbidities such as DM, HTN, lung diseases [classified as chronic obstructive pulmonary disease (COPD), asthma, bronchiectasis], renal diseases [classified as CKD, end-stage renal disease (ESRD) on dialysis, post kidney transplantation], chronic liver disease, heart diseases [classified as ischemic heart disease (IHD), heart failure, arrhythmia, valvar heart disease, pacemaker, intra-cardiac defibrillator (ICD)], neurological disorder, hematological disorder, active malignancy, psychiatry disorder, hypothyroidism, and hyperthyroidism. In-hospital complications included admission to the ICU, intubation, and renal dialysis during hospitalization.

Vital signs and symptoms at presentation included systolic blood pressure (SBP), diastolic blood pressure (DBP), temperature (T), heart rate (HR), respiratory rate (RR), random blood sugar (RBS), oxygen saturation (SpO2), fever, cough, dyspnea, chest pain, abdominal pain, sore throat, vomiting, headache, confusion, fatigue, loss of taste or smell, anorexia, fall, dizziness, diarrhea, and eye pain.

The laboratory results included hemoglobin (Hb) level, WBC count, lymphocyte count, platelet (PLT) count, CRP, alanine aminotransferase (ALT), albumin, creatinine, LDH, creatinine kinase, and ferritin. The radiological findings of interest were normal and right-side, left-side, or bilateral infiltrates.

The medications used during hospitalization were also recorded and they included antibiotics (azithromycin), antivirals (favipiravir, oseltamivir, lopinavir/ritonavir, ribavirin, and atazanavir), interferon therapy, anticoagulants (enoxaparin), immunoglobulin therapy, steroid (dexamethasone), tocilizumab, and anakinra.

Data Analysis

Statistical analysis was conducted using IBM SPSS Statistics for Windows, Version 28.0 (IBM Corp., Armonk, NY, USA). Data were cleaned and validated. The means and standard deviations were represented for the continuous variables, while

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categorical variables are presented as frequencies and percentages. The chi-squared test with exact p-value compared patient outcomes. An independent-samples t-test compared laboratory tests in relation to the patient outcome. The association between in-hospital mortality and various predictors was evaluated using multivariable logistic regression. All variables with a p-value > 0.2 in the bivariate analysis were included in the logistic regression model.

Ethical Considerations

The Research and Ethical Review and Approval Committee, Ministry of Health (MOH) of Oman approved this study; proposal ID: MoH/CSR/21/24967. Informed consent was waivered due to the retrospective nature of this study.

Results

A total of 731 patients aged ≥ 60 years presented to Sohar Hospital during the study period were COVID-19-positive. Of these, 327 were excluded due to wrong medical record number (*n* = 13), left against medical advice (*n* = 32), admitted to a health institution within 30 days before testing positive for COVID-19 by RT-PCR (n = 32), made an emergency department visit only (*n* = 238), and admitted for reasons other than COVID-19 as their SARS-CoV-2 infection did not require inpatient care (*n* = 12). Finally, the study included 404 patients with a mean age of 72.72 ± 8.93 (range, 60–108) years, of which 57.9% were male and 42.1% female (Table 1).

Table I: Study Sample Demographics

Variable		Frequency	Percentage
Age Group	60–69	162	40.1
	70–79	150	37.1
	80–89	75	18.6
	90 or more	17	4.2
Sex	Male	234	57.9
	Female	170	42.1

Hospital Admission Rates

Sohar Hospital admitted one patient with COVID-19 in March 2020 and none in April. Subsequently, the number of admitted cases increased and reached its maximum

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of 112 patients in July. The number of admissions decreased significantly to 70–79 in August, September, and October 23 in November, and 6 in December.

Comorbidities, symptoms, and chest radiography (CXR) findings

The most common comorbidities were HTN (73.1%), DM (55.6%), and heart diseases (29.2%). The most frequent presenting symptoms were cough (76.2%), fever (72%), shortness of breath (68.6%), poor oral intake (15.4%), and chest pain (14.6%). Other presenting symptoms included myalgia (11.4%), confusion (9.2%), falls (3.2%), and dizziness (3.2%). Vomiting was the most common gastrointestinal symptom (7.7%), followed by diarrhea (4.5%). A few patients presented with a loss of taste or smell (1.5%) or eye pain (0.5%).

Most patients (82.7%) had bilateral lung infiltrates, 9.4% had unilateral lung pathology, predominantly on the right, and 4.2% had normal CXR. CXR findings were not documented in 15% of the patients. Patient's Vital Signs on Arrival at the Hospital.

Table 2 shows the patients' mean, SD, minimum, and maximum vital signs on arrival at the hospital. The SBP and DBP were 136.25 ± 25.04 and 73.84 mmHg ± SD. respectively. The HR was 91.25 ± 16.22 beats/min, and the SpO2 in room air was 86.1 ± 10.8%. The RR and RBS were not documented on arrival at the hospital in approximately 52% and 31% of the patients, respectively. The body temperature was 37.04 ± 0.81ºC (range, 34.40–40.40°C).

Table II: Comorbidities, symptoms, vital signs, lab tests and medications during admission

		n	**%**	**Mean**	**SD**
Comorbidities	DM	223	55.6	-	-
	HTN	291	73.1	-	-
	Lung disease	36	8.9	-	-
	Renal disease	52	12.9	-	-
	Chronic liver disease	4	1	-	-
	Heart diseases	118	29.2	-	-
	Neurological disorder	53	13.1	-	-
	Hematological disorder	14	3.5	-	-

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	Active malignancy	9	2.2	-	-
	Psychiatry disorder	30	7.4	-	-
	Thyroid disorder	23	5.7	-	-
Symptoms	Fever	291	72	-	-
	Cough	308	76.2	-	-
	Dyspnea	277	68.6	-	-
	Chest pain	59	14.6	-	-
	Abdominal pain	24	5.9	-	-
	Sore throat	15	3.7	-	-
	Vomiting	31	7.7	-	-
	Headache	10	2.5	-	-
	Confusion	37	9.2	-	-
	Fatigue	32	7.9	-	-
	Diarrhea	18	4.5	-	-
	Myalgia	46	11.4	-	-
	Anorexia	62	15.4	-	-
	Fall	13	3.2	-	-
	Dizziness	13	3.2	-	-
CXR findings	Not documented	15	3.7	-	-
	Normal	17	4.2	-	-
	Abnormal, right side	26	6.4	-	-
	Abnormal, left side	12	3	-	-
	Abnormal, bilateral	334	82.7	-	-
Vital signs	SBP (mmHg)	399	-	136.25	25.04
	DBP (mmHg)	399	-	73.84	14.11
	HR (beats/min)	395	-	91.25	16.22
	RR (breaths/min)	197	-	25.14	6
	SpO_2 (%)	399	-	86.05	10.75
	Temperature (°C)	351	-	37.04	0.81
	RBS (mmol)	277	-	11.45	6.51

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Laboratory Test Results

The WBC count was 8.01 ± 4.17 × 10^9/L, lymphocyte count was 1.12 ± 0.80 × 10^9/L, hemoglobin was 12.06 ± 1.96 (range, 56.6–172.0) g/L, platelet count was 226.46 (range, 40.10–749.00) × 10^9/L, CRP was 128.52 ± 93.49 (range, 0.77–571.22) mg/L, albumin was 35.13 ± 5.04 (range, 21.32–77.60) mg/L, serum creatinine range was 5–1,361 µmol/L, ferritin range was 10.36–16,473.00 g/L, and LDH was 513.43 ± 269.78 (range, 40.15–2,061.70) U/L.

Medications Administered During Hospitalization

Most patients received enoxaparin as anticoagulant therapy (85.4%). Dexamethasone was prescribed to 69.1% of the patients, and azithromycin to 59.2%. The most used antibiotics upon admission were Amoxicillin/clavulanic acid (32.2%) and ceftriaxone (31.4%). Tocilizumab was prescribed to 20.5% of the patients, interferon therapy to 19.1%, hydroxychloroquine to 16.8%, and immunoglobulin therapy to 9.2%. The most prescribed antiviral medications were favipiravir (11.6%), lopinavir/ritonavir (4.5%), ribavirin (3.2%), and remdesivir (2%). Other medications used included vitamin D (12.4%), colchicine (7.9%), and anakinra (1.7%).

In-hospital Complications

Table 3 shows the three hospital complications involved in this study— ICU admission (16%), invasive ventilation (21%), and renal replacement therapy (9%).

Table III: In-Hospital Complications

		Frequency	Percentage
ICU admission	Yes	65	16.1
	No	339	83.9
Intubation	Yes	85	21.0
	No	319	79.0
Required dialysis during admission	Yes	35	8.7
	No	369	91.3

ICU: intensive care unit.

Patient Outcomes

Table 4 shows the primary outcome results. Two-thirds of the patients were discharged (63.6%), while 36.4% had died.

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Table IV: Patient Outcomes

Outcome	Frequency	Percentage
Discharged	257	63.6
Died	147	36.4

Logistic Regression Analysis

Age showed a significant association with mortality; the 80–89 age group was associated with higher mortality odds than the 60–69 age group (OR, 3.106; 95% CI, 1.599–6.032; $p = 0.001$). Males were more likely to die than females (AOR, 1.648; 95% CI, 1.038–2.618; $p = 0.004$). Mortality was also associated with renal diseases (AOR, 2.905; 95% CI, 1.448–5.826; $p = 0.003$), dyspnea (AOR, 4.067; 95% CI, 2.170–7.593; $p < 0.001$), confusion (AOR, 4.242; 95% CI, 1.732–10.390; $p = 0.002$), and abnormal CXR (AOR, 4.813; 95% CI, 0.834–27.766; $p = 0.079$; Table 5).

Table V: Logistic Regression Analysis

	Univariate		Multivariate			
	Crude OR	*P*-value	Adjusted OR	*P*-value	95% CI for OR	
Age group, years						
60–69	1		1			
70–79	1.691	0.031	1.637	0.065	0.970	2.763
80–89	2.611	0.001	3.106	0.001	1.599	6.032
90 or more	2.384	0.093	2.343	0.147	0.742	7.401
Sex (male)	1.779	0.007	1.648	0.043	1.038	2.618
HTN	0.710	0.140				
Chronic lung disease	0.579	0.174				
CKD	1.746	0.063	2.905	0.003	1.448	5.826
CXR (abnormal)	4.474	0.049	4.813	0.079	0.834	27.766
Fever	0.663	0.070				
Shortness of breath	2.107	0.002	4.067	< 0.001	2.178	7.593

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Headache	0.189	0.115				
Confusion (altered mental status)	1.971	0.050	4.242	0.002	1.732	10.390

OR: odds ratio; CI: confidence interval; HTN: hypertension; CKD: chronic kidney disease; CXR: chest X-ray.

Discussion

In this study, 404 patients under the age of 60 who had been hospitalised at the Sohar Hospital with a confirmed SARS-CoV2 infection were included. The clinical presentation of the older COVID-19 patients was characterised by high rates of fever, cough, dyspnea, poor oral intake, and chest pain. Just a few patients experienced falling and fainting, respectively. The right side was typically affected in patients with unilateral infiltrates, and most patients had bilateral lung infiltrates. Age, male sex, the presence of renal disease, dyspnea, confusion, and loss of taste or smell were all associated with patient mortality, which affected about 36% of the study population.

The mean study population age was 72.72 ± 8.93 years, higher than the mean age in other studies done in Oman that involves all age groups but lower than in studies on older adults done outside the gulf countries, particularly in Italy, where the older adults comprise 23.45 of the population [(9)]. For comparison, older adults comprise only 4.3% of the population in Oman [(10)].

Moreover, this study showed that males were at a higher risk of mortality than females, which was in line with previous reports [(11,12,13)]. The higher angiotensin-converting enzyme 2 (ACE2) levels in females might be associated with their lower mortality and disease severity [(14)]. Males were associated with higher odds of mortality than females (AOR, 1.648, 95% CI, 1.038–2.618, p = 0.004), in agreement with other studies [(12, 16, 18, 19, 20, 21, 22)]. Many researchers studied this sex difference, as Kelada et al. [(23)] proposed that the higher levels of ACE2 proteins in females might contribute to sex differences in mortality and disease severity. Vikse et al., [(15)] suggested that the testes act as a viral reservoir, delaying viral clearance and prolonging the viral load and accumulation in the lungs and other tissues.

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The most common symptoms in our study were cough (76.2%), fever (72.0%), shortness of breath (68.6%), poor oral intake (15.4%), and chest pain (14.6%). The first three were also common among symptomatic patients in other studies done in Oman [6, 8], while the last two were previously not addressed. Another important symptom not addressed in previous studies in Oman is confusion, found in 9.2% of our patients. Studies done outside Oman on the older age group reported anorexia in 21.2% of the patients [12] and confusion in 71.1% [11]. CXR was performed in all patients in our study. Most had bilateral lung pathology (82.7%), 6.4% had right-side pathology, 3.0% had left-side infiltrates, and 4.2% had normal CXR findings. A study in Oman found that bilateral infiltrates were presented in 85% of the patients [7]. However, this study involved predominantly young patients and those with severe and critical COVID-19.

The mortality rate in our study was 36.4%, higher than the rate reported in the Royal Hospital for a cohort of patients with COVID-19 (25.6%), although they only treated patients with severe and critical disease. This difference could be related to high hospital strain, human power deficiency, failure to adhere to standard treatments, and the vulnerable age group investigated in this study. A study in the USA by Fernández-Martínez et al., [16] reported that the 28-day hospital mortality rates ranged widely between facilities (0–82%). A study in Spain showed that adult (≥18 years old) patients with COVID-19 in-hospital mortality was 19% in males and 16% in females, while another study in Spain that investigated older adults (≥65 years old) with COVID-19 reported in-hospital mortality of 23%. Another study in Spain investigating older adults (≥80 years old) reported in-hospital mortality of 37% [12]. Evidently, the in-hospital mortality rate increased with the mean age of the study population. This trend can be explained by changes in the human physiological systems with age. Another factor that might contribute to the increase in mortality rate in the higher age group is delayed diagnosis and initiation of therapeutic interventions due to atypical presentations [17, 2].

Another significant risk factor for in-hospital mortality for patients with COVID-19 was the presence of renal diseases (AOR, 2.905; 95% CI, 1.448–5.826; p = 0.003). Al Wahaibi et al. [6] found that CKD was a risk factor for mortality in patients with COVID-19 (AOR, 2.7; 95%, CI, 1.35–5.38). Many other studies reported

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increased mortality risk in patients with renal diseases [13, 19, 20, 24]. Ando et al., [25] reported lower Toll-like receptors (TLRs) levels in patients with CKD than in healthy controls, which reflects impaired innate immunity and can explain the high risk for morbidity and mortality of patients with CKD and active infection. TLRs are found in monocytes and play an active role in recognizing pathogens and producing proinflammatory cytokines such as interleukin (IL)-6 and IL-8. Another explanation for the higher mortality risk in patients with chronic renal failure could be impaired T-cell activation due to defective expression of B7-2 (CD86) on monocytes of such patients treated by dialysis [26].

The association of other factors with increased mortality risk in older adults aged ≥ 60 years and hospitalized with COVID-19 need confirmation through further studies. These include dyspnea (AOR, 4.067; 95% CI, 2.17–7.593; $p < 0.001$), confusion (AOR, 4.242; 95% CI, 1.732–10.390; $p = 0.002$), and loss of taste or smell (AOR, 4.690; 95% CI, 0.802–27.410; $p = 0.002$).

Implications of this study

As mortality in older adults is higher than in younger adults, early diagnosis, careful monitoring, and appropriate treatment could benefit them, further multicentre studies focusing on this specific population in Oman are needed. A standardized electronic history-taking form is needed to ensure assessing common and high-risk symptoms and essential vital signs, particularly RBS, RR, and BMI, as these were often absent in our study population.

Limitations:

This study had several limitations, particularly its retrospective and homocentric characteristics. Some hospitalized patients remained in hospital for less than 48 h. We do not know their outcomes after discharge. Some important risk factors such as body mass index (BMI) and smoking history were not included in our analysis because they were not documented. The criteria based on which patients were diagnosed with dementia are unclear, and it was unknown whether a specialist assessed them. A standardized history-taking form was unavailable. If the patients did not voluntarily mention certain parameters, they would not be documented; for example, if a patient

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had anorexia or dyspnea but did not mention it, and the physician did not specifically ask about it, it was not documented as a presenting symptom. Some patients required ICU admission but were managed in a non-ICU ward because beds were unavailable. It was difficult to find if a patient was admitted to the ICU when this was not documented. Finally, the CXR images were interpreted by a physician rather than a radiologist.

Conclusion

In conclusion, this retrospective, cross-sectional study was the first to investigate older adult patients with COVID-19 managed in a secondary hospital in Oman. The study highlighted the importance of using simple and cheap parameters for the early identification of the high-risk population during hospitalization. These include RR before admission, oxygen saturation, C-reactive protein, and creatine. Some tests such as IL-6, creatine kinase, ferritin, and LDH were unavailable or in a limited supply. Moreover, health care personnel should ask older adult patients about certain symptoms, such as anorexia, confusion, and chest pain, and assess them because they significantly impact the outcome. It is imperative to develop strategies to prevent COVID-19 transmission to this vulnerable patient group.

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Declarations:

Availability of data and materials

The datasets used and/or analysed during the current study are available with the principal investigator

Competing Interest

No potential competing interest was reported by the author.

Funding

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Informed Consent Statement

Informed consent was waivered due to the retrospective nature of this study.

Consent for publication

The author gives her consent for publication; she agreed to publish this work

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