Research Article

Clinical Characteristics of Patients Diagnosed with COVID-19 in a Tertiary Hospital in Cali, Colombia

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Abstract

Introduction: SARS-CoV-2 infection is spreading around the world, including countries from Latin America. The purpose of the study was to assess clinical characteristics of patients with confirmed COVID-19 infection in a tertiary hospital in Cali, Colombia and to establish the factors associated with hospitalization and death of patients.

Materials and Methods: A retrospective descriptive study was carried out from 890 medical records of positive patients for COVID-19. Variables associated with hospitalization and event of death from COVID 19 were considered in the data analysis. Chi-square association tests and logistic regression models were used to establish the factors associated with the events of interest.

Results: Mean age of the patients was 36.5 years and 62.5% were women. The overall in-hospital mortality rate was 3.8%. The comorbidities that were associated with mortality were COPD, malnutrition, hypertension and obesity ($p < 0.05$). Our study shows that the variables age over 60 years ($p < 0.001$, OR = 6.2, CI = 2.3-16.9), dyspnea ($p = 0.028$, OR = 1.69, CI = 1.4 -10.9) and respiratory failure ($p < 0.001$, OR = 5.7, CI 1.9-7.6) were identified as independent predictors of hospital mortality.

Conclusion: The predictors of hospitalization were related to advanced age, male sex, and the presence of at least one symptom and an underlying comorbidity. However, elderly patients with COPD or malnutrition, hypertension, obesity, dyspnea, and respiratory failure are at increased risk of mortality.

Keywords: COVID-19; SAR-COV-2; Epidemiology; Clinical Characteristics; Risk Factors; Mortality; Hospitalization

Introduction

Severe acute respiratory syndrome due to coronavirus 2 (SARS-CoV-2) and named by the WHO as coronavirus disease 2019 (CO-VID-19) [1], is a public health problem worldwide [2,3]. The clinical features and characteristics are variable and include mild symp-

toms such as fever, cough, malaise, to severe complications such as respiratory failure, pneumonia, coagulopathy, gastrointestinal and neurological disease, liver and kidney damage [4-10].

Symptoms usually appear two to 14 days after infection. Transmission of the virus occurs through direct, indirect or close contact with infected symptomatic or asymptomatic persons through infected secretions such as saliva and respiratory secretions or respiratory droplets and aerosols generated by coughing, sneezing or talking, which may come into contact with the nose, mouth or eyes [11-13]. According to epidemiological reports, the presence of pre-existing health conditions (comorbidities) such as diabetes mellitus, cancer, hypertension, respiratory disease, obesity, among others, is associated with the probability of developing serious illness and death [14-16].

Therapy for COVID-19 is based on supportive treatment of patients in Intensive Care Units (ICU) due to respiratory, hepatic, renal and/or cardiovascular complications. In addition, therapies are used to prevent exacerbation of the inflammatory response and estrengthen the immune system [17].

The objective of this study was to evaluate the clinical characteristics of patients with confirmed COVID-19 infection in a tertiary hospital in Cali, Colombia. As well as establishing the factors associated with hospitalization and death of patients.

Materials and Methods

We conducted a retrospective descriptive study at a 139-bed tertiary care urban medical center based on epidemiological and clinical data obtained from the medical records of 1,514 adult patients (>18 years) diagnosed with COVID-19 between March 13 and December 31, 2020. All patients included in the study were confirmed with SARS-CoV-2 infection using quantitative RT-PCR assay on nasopharyngeal swabs.

Individual cases were reviewed by trained medical record professionals, and data collection was performed using an electronic data management system.

Patients who required hospitalization were those with the presence of radiological signs suggestive of pulmonary involvement with respiratory distress evidenced by respiratory rate ≥30 breaths/min, oxygen saturation ≤93% at rest, and partial pressure

of oxygen in arterial blood/oxygen concentration ≤ 300 mmHg (1 mmHg = 0.133 kPa), or with lesions progressing significantly >50% within 24 to 48 h on lung imaging, patients considered severe during management and treatment, also critically ill patients with some of the following criteria: respiratory failure requiring ventilation, presence of shock, and combined failure of other organs requiring monitoring and treatment in the ICU.

Data collection

The data file that contained complete information on all the variables of interest corresponded to 890 records, of which 294 belonged to individuals who were hospitalized, 25 of whom died. The records of the 625 patients with incomplete information, contained 241 that belonged to hospitalized individuals and 33 of them died.

Information was collected on demographic characteristics (sex, age, city of residence), clinical manifestations (fever, cough, runny nose, dyspnea, headache, sore throat, loss of taste/smell, conjunctivitis, diarrhea, and fatigue), comorbidities (arterial hypertension, chronic obstructive pulmonary disease [COPD], diabetes mellitus, AIDS/HIV, Chronic cardiac disease, malignancy, immune disease, malnutrition, obesity, chronic kidney disease [CKD], being a smoker and suffering from tuberculosis), having been hospitalized, complications associated with time of hospitalization [sepsis, acute respiratory distress syndrome (ARDS), acute cardiac injury/Stroke, pleural effusion] and days of hospitalization.

The study was approved by the Ethics Committee of the clínica Versalles in Cali, Colombia (CV-PI-0090-2020) and was carried out in accordance with the principles of the Declaration of Helsinki. Data analysis was carried out after anonymizing the records. The need for written informed consent was not necessary for patients due to the retrospective nature of the study.

Statistic analysis

Continuous variables are presented as median and inter- quartile range (IQR), and categorical variables are summarized as counts and percentages. To evaluate the significant differences in demographic variables, comorbidities and symptoms with hospitalization and patient survival, Chi-squared test/ Fisher test was performed for categorical variables.

Logistic regression analysis was used to identify characteristics associated with the event hospitalization and survival. The analysis

of survival among hospitalized patients presented as a limitation a sample of only 25 dead individuals (representing 4% of the total sample), which did not allow adjusting a binary model due to the strong asymmetry between cases and non-cases. It was decided to randomly take 1,000 samples of size 50 from the group of non-cases (hospitalized patients who did not die) and fit the same number of logistic regression models, always leaving the number of success event cases fixed (25 deaths). Parameter estimates for the final model were obtained by calculating the mean for the 1000 point estimates and the limits of the confidence intervals. A confidence interval of 95% (p < 0.05) was applied to represent the statistical significance of the results and the level of significance was assigned as 5%. Statistical analysis was performed using the R software version 3.6.3.

Results

General characteristics and socio-demographic data

In the present study, mean age of the patients evaluated in this study was 36.5 years and 54.2% of the patients were in the age range of 21 to 40 years. The female patients corresponded to 62.5% of the population with a mean age of 33 years and the men, 37.6% with a mean age of 47 years. The largest number of patients comes from the urban area of the city.

The most frequent signs and symptoms were cough (69.9%) and adynamia (50.3%) and fever (44.8%). The most frequent co-morbidities were hypertension (13.9%), obesity (8.8%) and diabetes mellitus (8.2%). Patients with one, two and three or more comorbidities corresponded to 18%, 8.1% and 4.3%, respectively.

Deceased patients corresponded to 3.8%, the highest number of deaths occurred in patients over 60 years of age (74.1%) and men (65.5%).

Variable		Median (range)
Age (years)		36.5 (18 - 103)
Hospital days		5 (0 - 58)
		n (%)
	<20	48 (3.17)
	21 - 40	821 (54.2)
	41 - 50	215 (14.2)
Age range	51 - 60	167 (11)
	> 60	263 (17.4)
	< 51	1084 (71.6)
	> 60	430 (28.4)

Sex	Male	569 (37.6)
	Female	945 (62.4)
Origin	rural area	338 (22.3)
	Urban area	1177 (77.7)
Signs and symptoms (n = 1514)	Cough	1058 (69.9)
	Fever	678 (44.8)
	Sore throat	552 (36.5)
	SOB/Dyspnea	363 (24)
	Fatigue	761 (50.3)
Signs and symptoms (n = 889)	Rhinorrhea	273 (30.7)
	Conjunctivitis	8 (0.9)
	Headache	365 (41.1)
	Diarrhea	151 (17)
	Anosmia	120 (13.5)
Comorbidities	Immune disease	47 (3.1)
	COPD	37 (2.4)
	Diabetes mellitus	124 (8.2)
	AIDS/HIV	8 (0.5)
	Chronic cardiac disease	64 (4.2)
	Malignancy	8 (0.5)
	malnutrition	11 (0.7)
	Obesity	133 (8.8)
	CKD	37 (2.4)
	Tobacco smoker	26 (1.7)
	Hypertension	211 (13.9)
	Tuberculosis Thyroid gland problem (hypothyroidism) Dementia	4 (0.3) 26 (1.7) 10 (0.7)
	One comorbidity	271 (18)
	Two comorbidities	123 (8.1)
	> 3 coexisting co-morbidities	65 (4.3)
Clinical evolution (n = 1013)	Pleural effusion	21 (2.1)
	Stroke	3 (0.3)
	Sepsis	8 (0.8)
	Respiratory distress syndrome	49 (4.8)

Table 1: Clinical, demographic characteristics and evolution of the 1514 patients with COVID-19.

COPD: Chronic Obstructive Disease; AIDS: Acquired Immune Deficiency Syndrome; HIV: Human Immunosuppressive Virus; SOB: Shortness of Breath; CKD: Chronic Kidney Disease

Factors associated with hospitalization

Most of the patients who required hospitalization reside in the city (72%), and the average hospital stay was five days. Table 2 summarizes the factors associated with the hospitalization of patients. Signs and symptoms as cough, sore throat, dyspnea, rhinorrhea, headache, and comorbidities: hypertension, diabetes mellitus, obesity, Chronic cardiac disease, Chronic kidney disease, COPD, smoker, hypothyroidism, malnutrition, malignancies, and being an AIDS/HIV patient were found associated with hospitalization.

Pleural effusion, stroke, sepsis, and respiratory failure were complications that developed significantly during hospitalization.

From the data of 889 patients who recorded complete information on all variables, a binary logistic regression analysis was adjusted. The factors that modify the probability of hospitalization were related to being male ($p < 0.001$, OR = 2.22, CI = 1.4-3.6), being between 41 and 50 years old ($p = 0.001$, OR = 2.21, CI = 1.2-4.2), with an increased risk for patients older than 60 years ($p = 0.001$, OR = 5.7, CI = 3.1-10.5) and presenting some symptomatology and comorbidity ($p < 0.001$, OR = 7.74, CI = 1.8-33.2, $p < 0.001$, OR = 2.69, CI = 1.7-4.4, respectively).

Variable		Hospitalized (n = 536)	Non-hospitalized (n = 978)	P-value
		n (%)	n (%)	
Age (years)**	<20*	10 (1.87)	38 (3.9)	0.001
	21 -40*	170 (31.7)	651 (66.6)	
	41 - 50*	75 (14)	140 (14.3)	
	51 - 60*	78 (14.6)	89 (9.1)	
	> 60*	202 (37.7)	61 (6.2)	
Sex	Male	289 (53.9)	280 (28.6)	<0.001
	Female	246 (45.9)	699 (71.5)	
Signs and symptoms (n = 1514)	Cough	421 (78.5)	637 (65.1)	<0.001
	Fever	358 (66.8)	320 (32.7)	<0.001
	Sore throat	133 (24.8)	419 (42.8)	<0.001
	SOB/Dyspnea	261 (48.7)	102 (10.4)	<0.001
	Fatigue	277 (51.7)	484 (49.5)	0.390
Signs and symptoms (n = 889)	N	294	595	
	Rhinorrhea	39 (13.3)	234 (39.3)	<0.001
	Conjunctivitis	2 (0.7)	6 (1)	0.079
	Headache	78 (26.5)	87 (48.2)	<0.001
	Diarrhea	54 (18.4)	97 (16.3)	0.067
	Anosmia	41 (13.9)	79 (13.3)	0.086
	One sign or symptom	96 (32.6 period 6)	218 (36.6 period 6)	<0.001
	>2 signs or symptoms	46 (15.6 period 6)	210 (35.3 period 3)	

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Comorbidities	Immune disease*	20 (3.7)	27 (2.8)	0.352
	COPD*	30 (5.5)	7 (0.7)	<0.001
	Diabetes mellitus*	90 (16.8)	34 (3.5)	<0.001
	AIDS/HIV*	6 (1.1)	2 (0.2)	0.026
	Chronic cardiac disease	53 (9.9)	11 (1.1)	<0.001
	Malignancy*	8 (1.5)	0	<0.001
	malnutrition*	11 (2.1)	0	<0.001
	Obesity*	82 (15.3)	51 (5.2)	<0.001
	CKD*	34 (6.3)	3 (0.3)	<0.001
	Tobacco smoker*	21 (3.9)	5 (0.5)	<0.001
	Hypertension*	126 (23.5)	85 (8.7)	<0.001
	Tuberculosis*	2 (0.4)	2 (0.2)	0.617
	Thyroid gland problem (hypo-thyroidism) *	15 (2.8)	11 (1.1)	0.022
	Dementia	8 (1.5)	2 (0.2)	0.005
	One comorbidity	143 (26.7)	128 (13.1)	
	Two comorbidities	83 (15.5)	40 (4.1)	<0.001
	> 3 coexisting comorbidities	55 (10.3)	40 (4.1)	
	n	380	633	
Clinical evolution (n = 1013)	Pleural effusion	21 (5.5)	0	<0.001
	Stroke	3 (0.8)	0	0.003
	Sepsis	8 (2.1)	0	<0.001
	Respiratory distress syndrome	49 (12.9)	0	<0.001
	Non-survivors	58 (10.8)	0	<0.001

Table 2: Distribution of the variable analyzed in hospitalized patients.

COPD: Chronic Obstructive Disease; AIDS: Acquired Immune Deficiency Syndrome; HIV: Human Immunosuppressive Virus; SOB: Shortness of Breath; CKD: Chronic Kidney Disease; Significant data p < 0.05.

*p-values from Fisher's exact test.

**adjusted p-values using Bonferroni tests for multiple comparisons.

Risk factors for in-hospital mortality

The association analysis between clinical and epidemiological variables in deceased patients shows that age over 51 years and being male are factors that are highly associated with death from COVID-19. Comorbidities such as COPD, malnutrition, hypertension, and obesity were also associated with mortality (p < 0.05). The presence of at least one comorbidity is significantly associated with mortality (p < 0.001). Complications during hospitalization associated with patient deaths were: pleural effusion, sepsis, and respiratory failure (Table 3).

Variable		Non-survivors (n = 58)	Survivors (n = 477)	P-value
		n (%)	n (%)	
Age range (years)	<20*	0	10 (2.1)	0.611
	21 -40*	1 (1.7)	169 (35.4)	<0.001
	41 - 50*	1 (1.7)	74 (15.5)	0.002
	51 - 60*	13 (22.4)	65 (13.6)	0.078
	> 60*	43 (74.1)	159 (33.3)	<0.001

Sex*	Male	38 (65.5)	251 (52.6)	
	Female	20 (34.5)	226 (47.4)	0.070
Signs and symptoms (n = 1514)	Cough*	34 (58.6)	104 (21.8)	0.499
	Fever*	43 (74.1)	315 (66)	0.240
	Sore throat*	7 (12.1)	126 (24.4)	0.016
	SOB/Dyspnea*	32 (55.2)	229 (48)	0.032
	Fatigue*	26 (44.8)	251 (52.6)	0.269
Signs and symptoms (n = 889)	n	25	269	
	Rhinorrhea	5 (20)	34 (12.6)	0.102
	Conjunctivitis	0	2 (0.7)	0.147
	Headache	4 (16)	74 (27.5)	0.085
	Diarrhea	5 (20)	49 (18.2)	0.155
	Anosmia	4 (16)	37 (13.8)	0.152
	n	58	477	
Comorbidities	Immune disease*	0	20 (4.2)	0.151
	COPD*	9 (15.5)	21 (4.4)	0.003
	Diabetes mellitus*	15 (25.9)	75 (15.7)	0.062
	AIDS/HIV*	0	6 (1.3)	1.0
	Chronic cardiac disease*	10 (17.2)	43 (9.)	0.060
	Malignancy	2 (3.4)	6 (1.3)	0.212
	malnutrition*	4 (6.9)	7 (1.5)	0.023
	Obesity*	15 (25.9)	67 (14)	0.031
	CKD*	6 (10.3)	28 (5.9)	0.246
	Tobacco smoker*	1 (1.7)	20 (4.2)	0.716
	Hypertension*	22 (37.9)	104 (21.8)	0.009
	Tuberculosis*	0	2 (0.4)	1.0
	dividing lines hypothyroidism*	4 (6.9)	11 (1.1)	0.068
	dividing lines Dementia*	0	8 (1.7)	1.0
	One comorbidity	19 (32.7)	124 (26)	
	Two comorbidities	15 (2.9)	68 (14.3)	
	> 3 coexisting comorbidities	10 (17.2)	45 (9.4)	0.001
	n	43	337	
Clinical evolution (n = 1013)	Pleural effusion	6 (14)	15 (4.5)	0.028
	Stroke	1 (2.3)	2 (0.6)	0.402
	Sepsis	4 (9.3)	4 (1.2)	0.002
	Respiratory distress syndrome	16 (37.2)	33 (9.8)	<0.001

Table 3: Factors associated with death in individuals hospitalized for COVID-19.

*obtained using Fisher's exact test. Significant data p < 0.05.

The descriptive analysis with the proportions of survival with respect to hospitalization time (Figure 1) allowed us to determine that 70% of deaths occurred after being hospitalized for at least 19 days.

The adjustment of the binary regression models showed that being older than 60 years (p < 0.001, OR = 6.2, CI = 2.3-16.9) and dyspnea (p = 0.028, OR = 1.69, CI = 1.4-10.9) were associated with risk of death. Respiratory failure was the complication associated with the risk of death in the evaluated population (p < 0.001, OR = 5.7, CI = 1.9-7.6). The model was adjusted for age, gender, odyno-phagia, dyspnea, comorbidities (COPD, hypertension, malnutrition, and obesity), sepsis, and respiratory failure.

Figure 1: Analysis for the proportions of deaths and days of hospitalization.

Variable		Non-survivors (n = 25)	Survivors (n = 269)	P-value
		n (%)	n (%)	
Age range (years)	<20*	0	7 (100)	0.533
	21 -40*	0	76 (100)	0.002
	41 - 50*	0	45 (100)	0.013
	51 - 60*	5 (13.5)	32 (86.5)	0.024
	> 60*	20 (15.9)	106 (84.1)	<0.001
Sex*	Male	18 (11)	145 (89)	
	Female	7 (5.3)	124 (94.7)	0.082
Signs and symptoms	Cough	18 (8.3)	198 (91.7)	0.862
	Fever	16 (8.9)	163 (91.1)	0.739
	Sore throat	5 (7)	66 (92.9)	0.612
	SOB/Dyspnea	19 (11.7)	143 (88.3)	0.028
	Fatigue	16 (9.2)	157 (90.8)	0.584
	Rhinorrhea*	5 (12.8)	34 (87.2)	0.224
	Conjunctivitis*	0	2 (100)	0.837
	Headache*	4 (5.1)	74 (94.9)	0.156
	Diarrhea*	5 (9.3)	49 (90.7)	0.50
	Anosmia*	4 (9.8)	37 (90.2)	0.472

Comorbidities	Immune disease*	0	11 (100)	0.370
	COPD*	2 (12.5)	14 (87.5)	0.403
	Diabetes mellitus*	8 (14)	49 (86)	0.085
	AIDS/HIV*	0	3 (100)	0.765
	Chronic cardiac disease*	5 (14.7)	29 (85.3)	0.146
	Malignancy*	0	3 (100)	0.765
	malnutrition*	1 (33.3)	2 (66.7)	0.235
	Obesity*	4 (13.3)	26 (86.7)	0.242
	CKD*	2 (11.8)	15 (88.2)	0.434
	Tobacco smoker*	0	15 (100)	0.255
	Hypertension	11 (13.4)	71 (86.6)	0.060
	Tuberculosis*	0 (0.0)	2 (100)	0.837
	dividing lines hypothyroidism*	1 (12.5)	7 (87.5)	0.513
	dividing lines Neurological disease*	0	8 (100)	0.487
	One comorbidity	7 (9)	71 (91)	
	Two comorbidities	5 (11 period 9)	37 (88.1)	
	>3 coexisting comorbidities	5 (15.6)	32 (84.4)	0.092
Clinical evolution (n = 1013)	Pleural effusion*	3 (20)	12 (80)	0.125
	Stroke*	1 (50)	1 (50)	0.162
	Sepsis*	1 (33.3)	2 (66.7)	0.235
	Respiratory distress syndrome*	10 (34.5)	19 (65.5)	0.001

Table 4: Logistic binary regression analysis of factors associated with death in individuals hospitalized for COVID-19.
*p-values obtained using Fisher's exact test. Significant data $p < 0.05$.

Discussion and Conclusion

In this study we found that, although the mean age of patients reported with COVID-19 infection was 36.5 years and 62.5% were women, the highest risk of hospitalization was found in patients between the ages of 41-50 years (p = 0.001, OR = 2.21, CI = 1.2-4.2), which increased in those older than 60 years (p = 0.001, OR = 5.7, CI = 3.1-10.5) and in men (p < 0.001, OR = 2.22, CI = 1.4-3.6). Epidemiological data regarding patients hospitalized for COVID-19 in European countries such as Bulgaria show an average of 52.9 years and 63% prevalence of men in [18] and in Spain, the average is 69 years and 57.5% prevalence in men [19]. In Asian countries, Zheng., et al. reported an average age of 49.4 years and 51.5% of the patients were men [5], and Li., et al. reported an average age of 57 years and a 53.3% prevalence in mens [20]. These data reflect

that, despite differences in demographic characteristics and national traits, the results obtained in this study are consistent with epidemiological reports from around the world.

The results of this study indicate that cough, sore throat, dyspnea, rhinorrhea and headache are the symptoms associated with hospitalization consistent with epidemiological reports [3-9]. However, dyspnea was the most prevalent symptom among deceased patients (11.7%) and was significantly associated with mortality during hospitalization. The literature reports that shortness of breath is common in hospitalized patients and is associated with more severe COVID-19 illness. But this is not always the rule, this symptom shows values that vary significantly between patients suffering from the disease. In the meta-analyses carried out by Rodríguez-Morales., et al. reported a prevalence of patients

with dyspnea of 45.6% [21], while Li., *et al.* reported 21.9% [22]. Shi., *et al.* in their study reported that dyspnea was significantly associated with higher mortality in adults with COVID-19 (p < 0.001, OR = 4.34, CI = 2.68-7.05) [23], similar to the results obtained in our study (p = 0.028, OR = 1.69, CI = 1.4-10.9).

However, dyspnea does not always correlate with disease severity and mortality. In fact, Guan., *et al.* found a low level of dyspnea (8.6%) in patients with high pulmonary involvement [24]. Currently this condition is called "silent hypoxemia" [25]. The variation in the prevalence of breathlessness across studies may be explained by differences in how it was investigated and documented. It can also be related to the physiological condition of the patient, it has been seen that this symptom is more accentuated in elderly patients and in those with diabetes. It is suggested that vascular damage due to glycosylation and age probably generates endothelial dysfunction, causing thickening of the pulmonary basal lamina, observed in autopsies of these patients, and contributes to the reduction of pulmonary diffusion [26]. Although no patient characteristics or comorbidities have been clearly associated with the respiratory distress detected in COVID-19.

This study established that arterial hypertension was the most prevalent comorbidity among hospitalized patients (37.9%) and was associated with mortality risk (p = 0.060, OR = 2.2, CI = 0.95-5.05). In agreement with several epidemiological studies establish that hypertension is strongly associated with poor clinical outcome [10,14-16]. In the study carried out by Guan., *et al.* reported that the most common comorbidity was hypertension 23.7% and patients (35.8%) who required ICU admission or mechanical ventilation or who died also had hypertension [24].

Zhang., *et al.* [27] reported that 37.9% of hypertensive patients developed severe disease. The meta-analysis carried out by Li., *et al.* showed that hypertension was present in 17.1% of patients diagnosed with covid-19, and patients with severe symptoms were twice as likely to be hypertensive compared to non-severe patients or those who were not admitted to the ICU [22]. The reason for this association is not clear, since the severity and mortality of infection is greater in elderly patients and hypertension is strongly related to age, the data could simply be confounded by age. However, an alternative explanation states that hypertension results in a series of pathophysiological changes in the cardiovascular system, such

as left ventricular hypertrophy and fibrosis that may make the hypertensive heart particularly susceptible to SARS-CoV-2 [28,29]. In this way, the endothelial injury that can be generated in hypertensive and diabetic patients with severe disease due to COVID-19 can trigger increased vascular permeability and pulmonary edema, altering gas exchange with different levels of severity with an increase in work respiratory failure and the development of acute respiratory failure [30], which would explain the association between respiratory failure and mortality in hospitalized patients found in this study.

Obesity significantly represented 25.9% among the patients who died. This comorbidity has been associated with an increased risk of complications from COVID-19, leading to the development of acute respiratory distress syndrome (ARDS) [30]. It is suggested that perhaps like hypertensive patients, the state of obesity induces pre-existing endothelial damage due to a state of inflammation [31].

Another comorbidity that was found significantly among the deceased patients was COPD with a 15.5% prevalence (p = 0.03). The meta-analysis conducted by Zhao., *et al.* found that in COPD patients, the risk of developing a severe form of COVID-19 is multiplied by four times [32]. The development of these severe forms is perhaps due to the increased levels of ACE2 in the lower airways that have been observed in patients with COPD, which triggers the acute exacerbation of the disease with a torpid course and great systemic effect [30,33,34].

An interesting result obtained in this study was eleven (11) patients who consulted with COVID-19 infection presented some degree of malnutrition and all of them were hospitalized, 6.9% died significantly (p = 0.023). In France, a study was carried out in which they reported that 37.5% of patients treated for COVID-19 disease had malnutrition and 3.8% of them died [35]. In addition to this fact, it is suggested that at least 60% of patients with COVID-19 suffer from malnutrition during the course of the disease, so the early implementation of a specialized nutritional support plan is recommended to improve the prognosis of these patients. by reducing hospital stay, the possibility of more severe respiratory distress and complications in general [36].

Our study has some limitations, the results obtained in this work all respond to a secondary analysis carried out on a file of

records of patients treated for COVID 19 in a level three center in the city of Cali, Colombia. Since, at the beginning of the COVID 19 pandemic, many clinical aspects of the disease were unknown, the file does not have information on all the signs and symptoms and some complications for a good part of the records, which in In many cases, the sample size is considerably reduced, which is considered a limitation of the study, especially when adjusting the binary regression models. However, the results reported are very useful to have more precise information on the clinical behavior of the disease and since the models are not predictive, establishing the presence of association between covariates and events such as hospitalization or death, allows us to have valuable knowledge that facilitates the design of management strategies for this type of patients.

In this study, hospital stay times were studied descriptively, given the conditions of the sample in which there is a very high percentage of censored data. It is considered that the information presented about this variable is useful and provides a basis for proposing hypotheses that can be evaluated later.

In conclusion, our study estimated that the predictors of hospitalization were related to being older and male with the presence of at least one symptom (cough, sore throat, dyspnea, rhinorrhea, headache), and an underlying comorbidity (hypertension, Diabetes mellitus, obesity, chronic heart disease, chronic kidney disease, COPD, smoking, hypothyroidism, malnutrition, malignancies, AIDS/HIV). All the complications studied (pleural effusion, stroke, sepsis, and respiratory failure) were significantly present in hospitalized patients. Older patients with severe disease, dyspnea, and respiratory failure have a higher mortality risk.

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Conflict of Interests

The authors have no conflict of interest to declare.

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