Socio-Clinical Profile, Management Outcomes, and Predictors of Mortality of COVID-19 Confirmed Patients Admitted to Perpetual Succour Hospital from March to September 2020: A Retrospective Study

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Abstract

Introduction: The sociodemographic factors have a substantial impact on COVID 19 and understanding the characteristics and clinical presentation of COVID-19 is essential for diagnosis, management, prevention, and targeting clinical care and allocating resources.

Objectives: To determine the socio-clinical profile, hospital outcomes and predictors of mortality of patients with COVID 19 in Perpetual Succour Hospital from March to September 2020.

Study Design: Retrospective observational study

Materials and Methods: The population consisted of 368 COVID 19 admitted patients in a tertiary hospital in Cebu City from March to September 2020. Data collection was done by reviewing the charts of the patients and analyzing for descriptive statistics.

Results: The COVID 19 patients were predominantly elderly males, smokers, with hypertension and diabetes. Smoking had a significant association with the mortalities. Cough, fever and dyspnea were the common manifestations. Intubated patients had a high mortality. Age, APACHE II and SOFA score, CRP level showed significant association with mortality. Acute kidney injury was the prevalent complication and respiratory failure was the primary cause of death. Majority of the admitted patients were classified as moderate and were discharged alive.

Conclusion: COVID 19 has a high recovery rate but poses a risk for the elderly, smokers and those with comorbidities. The manifestations mimic those of a respiratory infection and clinical parameters would usually be typical. Furthermore, acute kidney injury is common for infected patients, with respiratory failure and the need for intubation leading to increased morbidity and mortality.

Keywords: COVID19, socio clinical profile, outcomes, mortality

Introduction

COVID 19 has awakened the world when it started a global pandemic.[1] The earliest reports of many confirmed cases, and high mortality were recorded in the first outbreak in Wuhan, China on November 17, 2019. Wuhan was placed on unprecedented lockdowns.[2] On the 30th of January 2020, the Philippine Department of Health reported the first case of COVID-19 in the country in a 38-year-old female Chinese national. On March 7, 2020, the first local transmission in the country was confirmed. In Cebu, a province of the Philippines located in the Central Visayas (Region VII) region, over 4,000 active cases have been recorded to date as of writing this article.[3] The World Health Organization statistics reported 856,787 confirmed cases for the Western Pacific and accounted for 17,034 mortalities as of November 26, 2020.[4]

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According to an official report by the World Health Organization**,** the virus may have the potential for aerosol transmission in a relatively closed environment especially if exposed to high concentrations of aerosols for a long time.[5] Thus, the identification and control of suspected COVID-19 patients as early as possible is crucial in controlling the further spread of the epidemic by managing the source of infection and cutting off the transmission route. Moreover, appropriate health protocols should be followed, especially for the identified population at risk.

This study aims to provide local data among the confirmed COVID-19 patients admitted to the Perpetual Succour Hospital from March to September 2020 and to determine their sociodemographic characteristics, clinical profile, complications, and outcomes. The local data that will be collected will be useful to provide insights on COVID 19 and will assist in the possible control of this pandemic.

Given the spread of this new coronavirus and its impact on human health, the research community has responded rapidly to the new virus and many preliminary research articles have already been published about this epidemic.[6]

Significance of the Study. The purpose of this study was to provide local data on the sociodemographic characteristics, clinical profile, management, complications, hospital outcomes and predictors of mortality among adult COVID-19 patients admitted to the Perpetual Succour Hospital from March 2020 to September 2020. This study would help guide our fight against COVID 19 through preventive measures by awareness and education, proper risk assessment of suspected cases, allocation of therapeutic management and utilization of health resources to the vulnerable groups.

Research Question. What are the sociodemographic characteristics, clinical profile, management, complications, hospital outcomes, and predictors of mortality of COVID-19 confirmed adult patients admitted to the Perpetual Succour hospital from March 2020 to September 2020?

Objectives

General Objectives. To provide data on the sociodemographic characteristics, clinical profile, management, complications, hospital outcomes and predictors of mortality of adult patients with confirmed COVID 19 infections admitted to the Perpetual Succour Hospital from March 2020 to September 2020.

Specific Objectives

1. To determine the sociodemographic profile as to age, sex, occupation, smoking and alcohol drinking history, place of residence, presence of comorbidities, exposure history of adult patients admitted with confirmed COVID-19 infection
2. To determine the clinical profile of patients admitted with confirmed COVID-19 infection in terms of the following:
   - Presenting signs and symptoms
   - Vital signs
   - Severity of illness scoring (APACHE II, SOFA)
   - Laboratories
3. To determine the treatment of patients admitted with confirmed COVID-19 infection in terms of the following:
   - Antibiotics
   - Antivirals
   - Anticoagulant
   - Immunomodulators (steroids, IVIG, hemoperfusion, convalescent plasma therapy)
   - Adjunct medications (vitamin C, vitamin D, zinc, melatonin, colchicine)
   - Need for Supplemental Oxygen therapy and type of oxygen supplementation
   - Endotracheal Intubation
   - Sedatives
   - Neuromuscular blockade
   - Initiation hemodialysis
   - Proning
4. To determine the hospital outcomes of patients admitted with confirmed COVID-19 infection in terms of the following:
   - Complications
   - Severity on admission and discharge
   - Primary cause of death
   - Final disposition (alive or died)
5. To determine the predictors of mortality in the COVID 19 patients

Scope and Limitations. This paper focused on the socio-demographic profile of patients admitted to the Perpetual Succour Hospital with confirmed COVID-19 infection and their clinical characteristics, presentation, management, complications, hospital outcomes and predictors of mortality. This study was limited to healthcare workers in Perpetual Succour Hospital, who were admitted for COVID-19 with positive RT PCR via nasopharyngeal or oropharyngeal swab, and regardless of severity.

Definition of Terms

Adult - patients at least 18 years of age

Old age – 4th to 5th decade of life

Hypertension – diagnosed with hypertension by a physician or with history or is taking antihypertensive medications

Coronary artery disease – with history of myocardial infarction, underwent coronary intervention or documented thru 2D echo

Congestive heart failure – with signs and symptoms of heart failure (edema, neck distention) or documented thru cardiac function tests

Chronic respiratory disease – physician diagnosis of bronchial asthma or COPD or is taking medications for said condition

Autoimmune disease – patient diagnosed with diseases causing immune dysfunction (SLE etc)

Pregnancy – defined as a positive urine pregnancy test or elevated beta-HCG levels, by ultrasound, or as physician diagnosed

Diabetes - known case of diabetes mellitus, or history of intake of anti-diabetes medications or presence of an HbA1C > 6.5% Well controlled diabetes – Hba1c <8% Poorly controlled diabetes – Hba1c >8%

COVID 19 confirmed - any individual, irrespective of presence or absence of clinical signs and symptoms, who was laboratory-confirmed for COVID-19 in a test conducted at the National Reference Laboratory, a Subnational Reference Laboratory, and/or officially accredited laboratory testing facility or per hospital protocol

COVID suspect- any of the following: All SARI cases where NO other etiology fully explains the clinical presentation. ILI cases with any one of the following: With no other etiology that fully explains the clinical presentation OR With contact to a confirmed or probable case of COVID-19 disease during the 14 days prior to the onset of symptoms Individuals with fever AND/OR cough or shortness of breath or other respiratory signs and symptoms or diarrhea fulfilling any one of the following conditions: 18 years old and above With a comorbidity (i.e. Hypertension, Cardiovascular Disease, Diabetes, Kidney disease, COPD, Bronchial asthma and others) Assessed as having a high-risk pregnancy Health worker

COVID probable- a suspect case who fulfills anyone of the following: Suspect case whom testing for COVID-19 is inconclusive Suspect who underwent testing for COVID-19 but not conducted in a National or Subnational Reference Laboratory or officially accredited laboratory for COVID-19 confirmatory testing Suspect case for whom testing could not be performed for any reason

Smoking history. Current smoker –any form of smoking (including vaping) prior to onset of symptoms

Not a current smoker – does not fulfill criteria for current smoker

Acute kidney injury - defined as any of the following: Increase in Serum Creatinine by X0.3 mg/dl (X26.5 lmol/l) within 48 hours Increase in Serum Creatinine to X1.5 times baseline, which is known or presumed to have occurred within the prior 7 days K Urine volume of 0.5 ml/kg/h for 6 hours.

Acute hypoxemic respiratory failure - presence of hypoxemia with oxygen saturation (SaO_2) < 90%

Sepsis - suspected (or documented) infection and an acute increase in ≥ 2 sepsis-related organ failure assessment (SOFA) points Pneumonia - presence of fever, cough, dyspnea, tachycardia, chills, crackles and imaging findings of infiltrates

Acute coronary syndrome - symptoms of ischemia, new or presumed new significant ST segment and/or T wave changes or new LBBB, development of pathologic q waves on the ECG, imaging evidence of new loss of viable myocardium or new wall motion abnormality, identification of an intracoronary thrombus by angiography or autopsy

Arrhythmia - condition in which the heart beats with an irregular or abnormal rhythm

Cerebrovascular disease - abrupt onset of a neurologic deficit – such as hemiplegia (one-sided weakness), numbness, aphasia (language impairment), or ataxia (loss of coordination with radiologic evidence of infarct or bleed

Methodology

Study Design. This study used a retrospective observational design and was conducted at Perpetual Succour Hospital, covering a six-month period, from March to September 2020 (*Figure 1*).

Study Population and Sampling. This study employed complete enumeration. It included all adult patients with COVID 19, confirmed via positive RT PCR testing admitted to the Perpetual Succour Hospital from March to September 2020 regardless of the chief complaints, severity or final disposition provided they meet the inclusion criteria specified in this study.

Inclusion Criteria. The study included all patients admitted to the Perpetual Succour Hospital who are more than 18 years old, and are positive for COVID 19 RT-PCR regardless of severity.

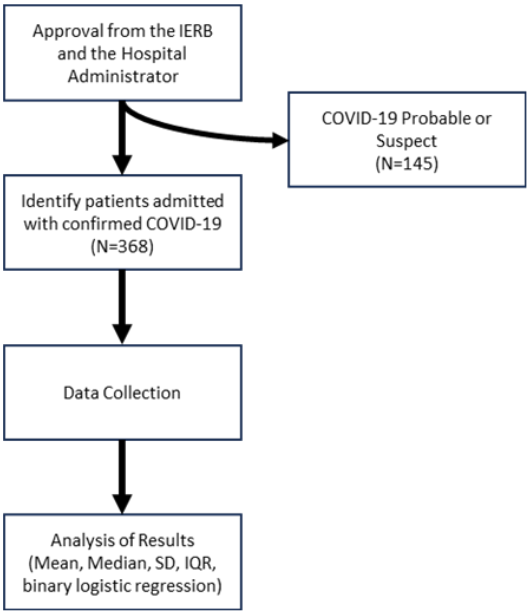

Figure 1. Flowchart of the Study

Table Ia. Sociodemographic profile of included patients

Sociodemographic Profile	Over-all N=368 (%)	Alive N=325 (%)	Expired N=43 (%)
Age in years, mean (SD)	57.79 (±16.52)	56.39 (±16.61)	68.35 (±11.30)
Sex, no (%)			
Female	170 (46.2)	151 (46.46)	19 (44.19)
Male	198 (53.8)	174 (53.54)	24 (55.81)
Employment			
Employed, healthcare	20 (5.43)	18 (5.54)	2 (4.65)
Employed, non-healthcare	107 (29.08)	100 (30.77)	7 (16.28)
Unemployed	241 (65.49)	207 (63.69)	34 (79.07)
with Smoking history	367 (99.73)	324 (99.69)	43 (100)
with Drinking history	47 (12.77)	42 (12.92)	5 (11.63)
Co-morbidities, *no (%)*			
Without	65 (17.66)	60 (18.46)	5 (11.63)
With	303 (82.34)	265 (81.54)	38 (88.37)
Hypertension	226 (61.58)	197 (60.62)	29 (67.44)
Diabetes	151 (41.03)	130 (40.00)	21 (48.84)
Chronic Renal Disease	48 (13.08)	38 (11.69)	10 (23.26)
Asthma	20 (5.6)	17 (5.23)	3 (6.98)
Ischemic or coronary artery disease	18 (4.9)	15 (4.62)	3 (6.98)
Previous stroke or CVD	10 (2.8)	9 (2.77)	1 (2.33)
Immunodeficient state	10 (2.8)	8 (2.46)	2 (4.65)
Malignancies	9 (2.45)	5 (1.54)	4 (9.30)
Chronic liver diseases	4 (1.1)	4 (1.23)	0 (0.00)
COPD	4 (1.1)	3 (0.92)	1 (2.33)
Hematologic diseases	3 (0.82)	3 (0.92)	0 (0.00)
Tuberculosis	3 (0.82)	3 (0.92)	0 (0.00)
Pregnant	23 (13.5)	23 (7.08)	0 (0.00)

Table Ia. Sociodemographic profile of included patients

Place of residence, *no (%)*	Over-all, N=368
Cebu City	225 (61.14)
Cebu Province	42 (11.41)
Danao City	7 (1.9)
Lapu-Lapu City	10 (2.72)
Mandaue City	50 (13.59)
Naga City	2 (0.54)
Talisay City	23 (6.25)
Toledo City	7 (1.9)
Outside Cebu	2 (0.54)

Exclusion Criteria: (1) COVID probable/suspect patients; or (2) Patients with negative RT PCR results

Study Setting. The study was conducted in Perpetual Succour Hospital, Gorordo Avenue, Cebu City, Philippines.

Research Instruments. Patient's charts were reviewed to gather the data needed for the study. Data that were collected included: patient characteristics, past medical history, laboratory results and medical therapies and outcomes.

The protocol was submitted for approval to the Institutional Ethics and Review Board (IERB) and the Hospital administrator. Once approved, we identified COVID 19 patients with a positive RT PCR result by chart review of the list of patients through the medical records and from the Infectious Committee of our institution. The data collection form was then used to record data gathered such as socio-demographic profile, laboratory results, medical therapies, complications, and hospital outcomes. Data gathered were handled with utmost confidentiality, collated, and analyzed.

Statement of Confidentiality. All patients were labeled according to the assigned numbers and codes instead of their names. Patient's data were collated with utmost confidentiality.

Data and Statistical Analysis. Descriptive statistics such as mean, standard deviation, median, interquartile range, minimum and maximum values were reported to describe the different numerical variables which characterized the patients. Frequency distribution and percentage were used to present the data for all categorical variables with frequency counts in order to summarize results.

Binary Logistic Regression was employed to describe the relationship between variables considered as predictors of final disposition and a binary response (recovered or died), with 5% margin error. A significance level of p=0.05 indicates a 5% risk of concluding that an association exists when there is no actual association. If the p-value is less than or equal to the significance level, it can be concluded that there is a statistically significant association between the response variable and a predictor. Coefficients were also noted. Positive coefficients indicate that the event becomes more likely as the predictor increases. Negative coefficients indicate that the event becomes less likely as the predictor increases. Further, odds ratio was computed to understand the effect of a predictor. Odds ratios for the continuous predictors that are greater than 1 indicate that the event is more likely to occur as the predictor increases. Odds ratios that are less than 1 indicate that the event is less likely to occur as the predictor increases. For categorical predictors, the odds ratio compares the odds of the event occurring at different levels of the predictor.

Data were entered with Microsoft Excel Spreadsheet Minitab version 19.0, a statistical software package, Mac Mojave OS was used in the statistical computations and analysis of data.

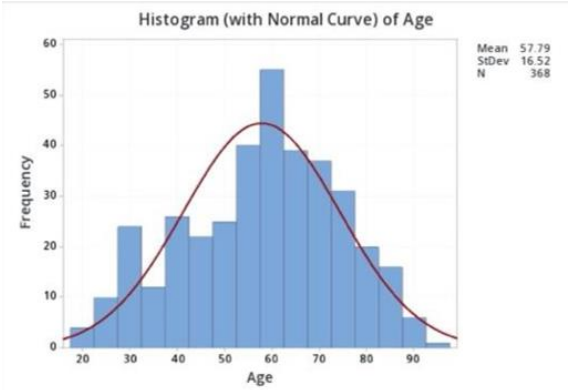

Figure 2a. Histogram of Age for All Patients with Normality Curve (Y-frequency)

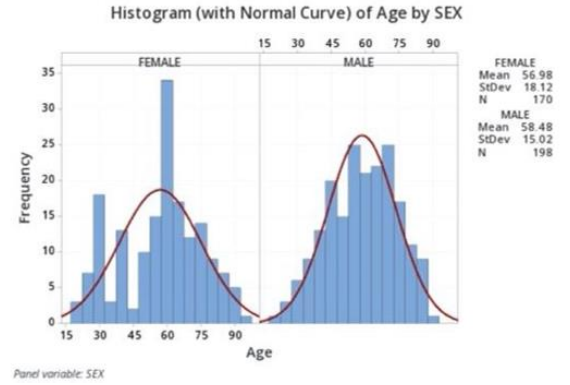

Figure 2b. Histogram of Age for All Patients by Sex with Normality Curve

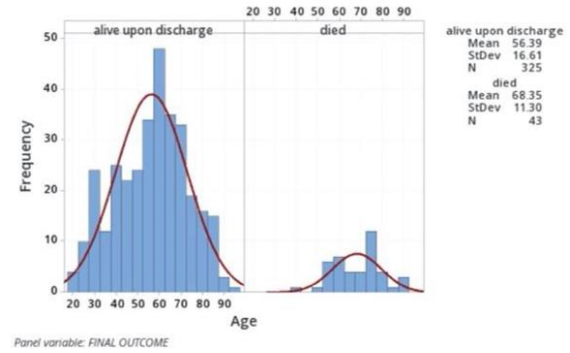

Figure 2c. Histogram of Age for All Patients by Final Outcome with Normality Curve

Ethical Considerations. This paper is not supported by any company or individual who will benefit from the results of the study whether directly or indirectly. Further, respondents' records were held in strictest confidentiality. All information collected from the study or during its course will not be divulged to any individual or organization. The researchers hereby declare no conflict of interest in the conduct of this study.

Results

The sociodemographic profile of patients are shown in *Table I*. The patients infected with COVID 19 generally had a mean age of 57.78 years (range 18-94) and those who expired had a mean age of 68.35 years. Infected patients were mostly males (53.80%) and unemployed. Majority of them were smokers (99.73%), which was also associated with an increased rate of mortality (99.69%). Most patients in the study were residing in Cebu City (61.14%) and had at least one comorbidity (82.34%) with hypertension (74.59%) being the most common, then followed by diabetes (49.83%).

Table II. Sociodemographic profile: Exposure history (N=368)

COVID-19 Patients Exposure History	No (%)
Contact with, or as a healthcare working handling COVID cases	13 (3.53)
Contact with a confirmed case	43 (11.68)
Contact with a suspect or probable case	27 (7.34)
History of travel to an area of reported local transmission	97 (26.36)
Residence in area with reported local transmission	129 (35.05)
History of travel outside the Philippines	1 (0.27)
Uncertain exposure history	188 (51.09)

Table III. Clinical Profile: Presenting signs and symptoms

Reported Symptoms	Over-all, N=368 (n, %)
Cough	246 (66.85)
Fever	219 (59.51)
Dyspnea	150 (40.76)
Fatigue	128 (34.78)
Myalgia/arthralgia	70 (19.02)
Diarrhea	36 (9.78)
Headache	31 (8.42)
Coryza	29 (7.88)
Loss of taste	21 (5.71)
Sore throat	18 (4.89)
Anosmia	17 (4.62)
Nasal congestion	16 (4.35)
Nausea and vomiting	14 (3.8)

In this cohort, the age distribution of patients infected and hospitalized for COVID-19 shows a unimodal distribution for females while bimodal (peaks twice) for the males (see *Figure 2*). The frequency of COVID-19 increased sharply at the age of 60 years old in females while peaks twice of 55 and 70 respectively for the males.

Table II shows the exposure history of the hospitalized patients. More than one-third (35.05%) of the patients had a residence in area with reported local transmission. Almost 12% had contact with a confirmed case, while 26.36% had a history of travel to an area of reported local transmission. Interestingly, most of the respondents claimed that they were uncertain about their exposure history which recorded more than half of these patients.

Table III describes the common signs and symptoms reported by the patients upon admission. It showed that cough (66.85%), fever (59.51%) and dyspnea (40.76%) were the usual manifestations.

Table IV. Clinical Profile: Vital Signs and Illness Severity Scoring

Patients' Presenting Vital signs and Illness Severity Scoring	Over-all N=368	Alive N=325	Expired N=43
Vital Signs			
Temperature (°C), *mean (SD)*	37.02 (0.87)	37.01 (0.87)	37.06 (0.90)
SBP (mmHg), *mean (SD)*	127.13 (20.45)	126.10 (20.01)	134.88 (22.29)
DBP (mmHg), *mean (SD)*	77.41 (11.56)	77.72 (11.72)	75.12 (10.09)
MAP, *mean (SD)*	93.92 (11.98)	93.75 (12.03)	95.19 (11.72)
HR (bpm), *mean (SD)*	93.25 (17.73)	92.94 (17.44)	95.56 (19.87)
RR (cpm), *mean (SD)*	23.85 (6.77)	23.06 (6.18)	29.79 (8.00)
O2 Sat (%) at room air, *mean (SD)*	92.3 (10.64)	93.46 (9.51)	83.51 (14.18)
Illness Severity Scoring			
Acute Physiology and Chronic Health Evaluation II (APACHE II) Score, *mean (SD)*	8.75 (5.29)	8.01 (4.87)	13.90 (5.30)
Sequential Organ Failure Assessment (SOFA) Score, *mean (SD)*	2.23 (2.60)	1.79 (1.96)	5.58 (4.04)

Table V. Clinical Profile: Laboratory findings. Median, (Interquartile Range)

Patients' Laboratory and Radiographic Findings	Over-all (N=368)	Alive upon discharge (no=325)	Expired (no=43)
Complete Blood Count			
WBC (X10^9/L)	8.38 (5.98-11.52)	7.92 (5.86-11.2)	9.60 (7.5-15.1)
Neutrophils (%)	75.00 (67-84)	74.00 (66-82.75)	83.00 (75-90)
Lymphocytes (%)	16.00 (9-23)	17.00 (10-24)	10.00 (5-16.25)
Absolute Neutrophil Count	735.00 (454-1473)	697.00 (438-1373)	961.00 (668-1824)
Absolute Lymphocyte Count	139.90 (84-242.5)	145.50 (88.5-258)	92.30 (69.3-161)
Hemoglobin (g/dL)	13.00 (11.5-14.2)	13.05 (11.5-14.1)	13.00 (11.2-14.6)
Hematocrit (%)	39.00 (34.6-42.4)	39.00 (34.7-42.4)	38.00 (32-43.2)
MCV (fL)	85.90 (82.7-89.73)	86.00 (82.7-89.9)	85.00 (83-89)
MCH (pg)	28.70 (27.25-30)	28.75 (27.3-30)	28.70 (27-30.5)
Platelet (x10^9/L)	192.50 (142.75-262)	192.00 (147-262)	201.00 (136-273)
Inflammatory Markers			
LDH (U/L)	293.00 (213-432)	274.00 (209-401)	526.50 (343-683.3)
CRP (mg/dL)	5.49 (1.69-11.33)	4.82 (1.5-10)	11.97 (7.53-17.7)
Ferritin(ug/mL)	1051.00 (539-1845)	953.00 (452-1721)	1397.00 (935-2126)
D-dimer (ug/ml)	1030.00 (575-2130)	978.00 (550-2001)	1790.00 (943-6075)
Procalcitonin (ng/mL)	0.14 (0.05-0.57)	0.11 (0.05-0.36)	0.78 (0.21-2.64)
Arterial Blood Gas			
pH	7.42 (7.37-7.45)	7.42 (7.38-7.45)	7.40 (7.34-7.5)
pCO_2 (mmHg)	26.20 (23.5-30.25)	26.25 (23.5-30.1)	26.10 (24-31)
HCO_3(mmol/L)	17.45 (14.83-19.88)	17.40 (15.2-20)	17.50 (13.9-19.1)
SO_2 (%)	96.00 (91.13-98)	96.00 (92.9-98)	90.00 (80-96.5)
paO_2 (mmHg)	80.75 (61.25-99.22)	83.50 (65.2-100)	62.00 (45.5-88.9)
FiO_2 (%)	21.00 (21-21)	21.00 (21-21)	21.00 (21-44)
PFR	347.74 (239.8-454.5)	380.00 (282-460)	170.40 (138-285.7)
A-a (mmHg)	38.00 (17.2-66)	32.45 (16.8-57.8)	87.00 (49-231.2)
Blood Chemistries			
SGPT (U/L)	50.00 (31-77)	50.00 (32-78)	46.00 (29.25-75)
Creatinine (mg/dL)	1.02 (0.77-1.32)	0.96 (0.75-1.27)	1.34 (1.06-1.66)
eGFR	72.00 (51.33-96.9)	77.60 (56-98.75)	51.45 (30.6-61.7)
Sodium (mmol/L)	136.00 (132-140)	137.00 (133-140)	133.00 (132-140)
Potassium (mmol/L)	3.80 (3.5-4.2)	3.80 (3.5-4.1)	3.70 (3.4-4.3)
HbA1c (%)	6.40 (5.9-7.2)	6.40 (5.98-7.2)	6.50 (5.77-8.43)
Electrocardiogram			
ECG-Rate	88.50 (78-102)	88.00 (78-100)	100.00 (79-108)
ECG-QTC (msec)	0.40 (0.36-0.44)	0.40 (0.36-0.44)	0.40 (0.3-0.4)

Table IV describes the mean vital signs upon admission of our patients. The mean temperature (37.02), systolic blood pressure (127.13), diastolic blood pressure (77.41), mean arterial pressure (93.92), heart rate (93.25), O2 saturation (92.3) were within the normal range except for respiratory rate (23.85). The illness severity scoring also revealed a mean APACHE II of 8.75 and SOFA score of 2.23. APACHE II and SOFA scores of expired patients were higher compared to those who were alive.

Table V shows the laboratory findings on admission of our admitted COVID19 patients. The median scores for

Table VI. Clinical Profile: Radiographic Findings

Patients' Laboratory and Radiographic Findings	Over-all N=368	Alive N=325	Expired N=43
Serology, *no (%)*			
IgM reactive	149 (40.49)	135 (41.54)	14 (32.56)
IgG reactive	135 (36.68)	126 (38.77)	9 (20.93)
Electrocardiogram, *no (%)*			
Atrial Fibrillation	5 (1.36)	4 (1.23)	1 (2.33)
Sinus	292 (79.35)	257 (79.08)	35 (81.40)
X-Ray Findings, *no (%)*			
Infiltrates	189 (51.36)	160 (49.23)	29 (67.44)
Consolidation	133 (36.14)	103 (31.69)	30 (69.77)
Effusion	32 (8.7)	22 (6.77)	10 (23.26)
CT Scan Findings, *no (%)*			
Ground glass opacities	214 (58.15)	190 (58.46)	24 (55.81)
Consolidation	151 (41.03)	124 (38.15)	27 (62.79)
Effusion	27 (7.34)	21 (6.46)	6 (13.95)

Table VIIa. Treatment and Management of COVID-19 patients

Patients' Treatment and Management	Overall N=368 No., %
ANTIBIOTICS	
Azithromycin	244 (66.30)
Piperacillin tazobactam	156 (42.39)
Ceftriaxone	130 (35.33)
Meropenem	60 (16.30)
Levofloxacin	32 (8.70)
Vancomycin	31 (8.42)
Cefuroxime	25 (6.79)
Cefixime	13 (3.53)
Cefepime	11 (2.99)
Linezolid	3 (0.82)
ANTIVIRALS	
Lopinavir Ritonavir	144 (39.13)
Favipiravir	110 (29.89)
Remdesivir	64 (17.39)
Oseltamivir	10 (2.72)
ANTICOAGULANTS	
Enoxaparin	285 (77.45)
Rivaroxaban	63 (17.12)
Warfarin	4 (1.09)
ANTIPLATELETS	
Clopidogrel	36 (9.78)
Aspirin	25 (6.79)
IMMUNOMODULATOR	
Tocilizumab	112 (30.43)
Convalescent Plasma Transfusion	22 (5.9)
Hemoperfusion	9 (2.4)
Intravenous Immunoglobulin	9 (2.45)
Interferon	1 (0.27)
STEROIDS	
Dexamethasone	165 (44.84)
Hydrocortisone	7 (1.90)
Methylprednisolone	6 (1.63)
Prednisone	6 (1.63)
Prednisolone	1 (0.27)
OTHERS	
Hydroxychloroquine	20 (5.43)

complete blood count: WBC (8.38), neutrophils (75), ANC (735), hemoglobin (13), hematocrit (39), MCV (85.9), MCH (28.7), platelet (192.5) were within normal limits except for lymphocytopenia (16) with decreased absolute lymphocyte count (139). There was also no noted major disparity between the mean values of those who were alive and expired except for a lower lymphocyte (10) and ALC (92.3) with higher ANC (961) for the expired group compared to the alive patients. The median scores for inflammatory markers LDH (293), CRP (5.49), ferritin (1051), D-dimer (1030) were elevated except for procalcitonin (0.14). The median inflammatory markers for the alive and expired group were generally both elevated. The median scores for arterial blood gas showed predominant respiratory alkalosis; pH (7.42), pCO_2 (26.2), HCO_3 (17.45), PO_2 (80.75) but elevated A-a gradient (38). There was also noted lower median value for PaO_2 (62), PFR (170) and higher A-a gradient (87) in the expired patients. Median scores of clinical chemistries such as SGPT (50), creatinine (1.02), electrolytes (sodium (136), potassium (3.8)) showed normal limits. The predominant rate on ECG 12L was 88 bpm, with median corrected QTC interval (0.40) within normal limits. The results for the expired and alive groups were comparable to each other.

Table VI shows other laboratories and radiographic findings of our admitted COVID patients. Predominantly, patients had sinus rhythm (79.35%) upon admission. More than 50% presented with infiltrates (51.36%) and ground glass opacities (58.15%) on imaging but was not associated with increased mortality as evidenced by the increased number of patients in the alive group despite having these findings in their imaging results compared to the ones who expired.

In terms of antibiotics, azithromycin (66.30%) and Piperacillin tazobactam (42.39%) were the commonly used medications (*Table VIIa*). Antibiotic use did not show a significant benefit as all patients (100%) in the expired group were able to receive antibiotics. Likewise, Lopinavir Ritonavir (39.13%) and Favipiravir (29.89%) were the antivirals commonly administered. In the use of antivirals, there was no significant difference as majority in both the alive (77.54%) and expired (76.74%) groups were able to receive the medication. Around 30% of patients were given tocilizumab and more than 50% in the expired group were able to take the medication. The commonly used anticoagulant was enoxaparin (77.45%) and around 80% of the patients were given enoxaparin in both the alive and expired groups (*Table VIIb*).

Table VIIIa shows that patients who needed oxygen supplementation (52%) were comparable to those who did not need it (48%). However, 35 out of the 43 or more than 80% expired even if they were already on oxygen supplementation (*Table VIIIb*). Endotracheal intubation was also initiated to 10% of the admitted patients and majority (67.44%) of the intubated patients expired.

As to the outcomes, the average duration of admission was recorded to be 10.348 (8.02) days (*Table IXa*). The patients also spent an average 8.265 (0-26) days once

Table VIIb. Treatment and Management of COVID-19 patients

Patient Treatments	Overall (N=368)	Alive (N=325)	Expired (N=43)
Antibiotics, *no (%)*	352 (95.65)	309 (95.08)	43 (100)
Antivirals, *no (%)*	285 (77.45)	252 (77.54)	33 (76.74)
Hydroxychloroquine, *no (%)*	20 (5.43)	12 (3.69)	8 (18.60)
Tocilizumab, *no (%)*	112 (30.43)	88 (27.08)	24 (55.81)
IVIg, *no (%)*	9 (2.45)	4 (1.23)	5 (11.63)
Anticoagulants, *no (%)*	301 (81.79)	263 (80.92)	38 (88.37)
Antiplatelets, *no (%)*	62 (16.85)	50 (15.38)	12 (27.91)

Table VIIIa. Treatment and management of COVID 19 patients

Patients' Treatment and Management	Overall (N=368) (No. %)
OXYGEN THERAPY	
Without	177 (48)
WITH	191 (52)
Nasal Canula	174 (47.28)
Face Mask	38 (10.33)
Non-invasive Ventilation	1 (0.27)
High flow nasal canula	22 (5.98)
Intubation	39 (10.60)
SEDATIVES	
Midazolam	19 (5.16)
Propofol	2 (0.54)
OTHER INTERVENTIONS	
Neuromuscular blockade	16 (4.35)
Proning	82 (22.28)
Initiation Hemodialysis	39 (10.60)

Table VIIIb. Treatment and management of COVID 19 patients

Patients' Treatment and Management	Over-all N=368	Alive (N=325)	Expired (N=43)
Supplemental O_2 therapy, *no (%)*	191 (51.90)	156 (48.00)	35 (81.40)
Endotracheal Intubation, *no (%)*	39 (10.60)	10 (3.08)	29 (67.44)
Sedatives, *no (%)*	21 (5.71)	3 (0.92)	18 (41.86)
Proning, *no (%)*	82 (22.28)	53 (16.31)	29 (67.44)
Hemoperfusion, *no (%)*	11 (2.99)	5 (1.54)	6 (13.95)
Hemodialysis, *no (%)*	39 (10.60)	25 (7.69)	14 (32.56)

admitted to the Intensive Care Unit (ICU). Acute kidney injury (15.49%) was the most prevalent complication of admitted patients and respiratory failure as the primary cause of death for the expired patients (*Table IXb*). There was no significant difference for the hospital duration and ICU stay for both the alive and expired groups. More than 50% of patients in the expired group had acute kidney injury (65.12%), respiratory failure (62.79%) and sepsis (55.81%).

It can be inferred that there is a statistically significant association between the age, APACHE II Score, SOFA Score, CRP, Critical Care Duration, and Final Disposition Severity of COVID-19 patients and their recovery (*Table X*). All their positive coefficients indicate that death becomes more likely if the variable increases. This is supported by their odds ratios which are all greater than 1.000, indicating that death is more likely to occur as these predictors increase. For every 1-year increase in age, the likelihood that death occurs increases by approximately 1.054 times. For every 1-point increase in APACHE II Score, the likelihood that death occurs increases by approximately 1.125 times. For every 1-point increase in SOFA Score, the likelihood that death occurs increases by approximately 1.66 times. For every 1 mg/dL increase in the inflammatory marker CRP, the likelihood that death occurs increases by approximately 1.06 times. For every day of increase in critical care duration, the likelihood that death occurs increases by approximately 1.107 times. Lastly, for every step increase in severity level, the likelihood that death occurs increases by approximately 10 times. Furthermore, it can also be inferred that there is a statistically significant association between PFR and eGFR of COVID-19 patients and their recovery. Contrary to the above variables, they display negative coefficients. These indicate that death becomes more likely if these two variables decrease. This is supported by their odds ratios which are all lesser than 1.000, indicating that death is less likely to occur as the predictor increases. Therefore, as the patients' PFR and eGFR readings increase, death is less likely to occur.

Figure 3.1 reveals the hospital outcomes of COVID19 patients admitted at the hospital. The figure shows that 87% of the total patients recovered while 12% of the patients died. *Figure 3.2* illustrates that both in the admission and final disposition, majority of the patients were classified as moderate in terms of severity. It should also be noted that deaths increased upon final disposition for critically-ill patients compared to admission.

Discussion

The coronavirus belongs to a family of viruses that may cause various symptoms such as pneumonia, fever, breathing difficulty, and lung infection.[6] These viruses are common in animals worldwide, but very few cases have been known to affect humans. WHO used the term 2019 novel coronavirus to refer to a coronavirus that affected the lower respiratory tract of patients with pneumonia in Wuhan, China on 29 December 2019.[7]

The median age of the people infected with COVID 19 was 75 (range 48-89) years. Fever (64.7%) and cough (52.9%) were the most common first symptoms. The median number of days from the occurrence of the first symptom to death was 14.0 (range 6-41) days, and it tended to be shorter among people aged 70 years or more (11.5 [range 6-19] days) than those aged less than 70 years (20 [range 10-41] days; $p = 0.033$).[8]

Table IXa: Complications of COVID 19 patients (N=368)

Patients' Outcomes	Mean (± SD)	Min-Max
Duration of admission (days)	10.348 (8.02)	1-84
ICU Duration (days)	8.265 (5.94)	0-26
COMPLICATIONS	No.	%
Acute kidney injury	57	15.49
Acute hypoxemic respiratory failure	55	14.95
Sepsis	55	14.95
Acute coronary syndrome	9	2.45
Arrhythmia	8	2.17
Cerebrovascular disease	5	1.36
Cardiomyopathy	4	1.09
Venous thromboembolism	2	0.54
CAUSE OF DEATH (N=43)	No.	%
Acute respiratory failure	27	62.79
Sepsis/Septic shock	24	55.81
Acute coronary syndrome	5	11.63
Arrhythmia	4	9.3

Table IXb. Complications of COVID 19 patients

Patient Outcomes	Over-all N=368	Alive (N=325)	Expired (N=43)
Duration of admission in days, Mean (± SD)	10.35 (8.02)	10.33 (7.13)	10.49 (13.01)
ICU Duration in days, Mean (± SD)	8.27 (5.94)	8.25 (5.39)	8.29 (6.75)
COMPLICATIONS			
AKI, no (%)	57 (15.49)	29 (8.92)	28 (65.12)
ARF, no (%)	55 (14.95)	28 (8.62)	27 (62.79)
Sepsis, no (%)	55 (14.95)	31 (9.54)	24 (55.81)
ACS, no (%)	9 (2.45)	4 (1.23)	5 (11.63)
Arrhythmia, no (%)	8 (2.17)	4 (1.23)	4 (9.30)
CVD, no (%)	5 (1.36)	5 (1.54)	0 (0.00)
Cardiomyopathy, no (%)	4 (1.09)	2 (0.62)	2 (4.65)

Table X. Predictors of Mortality

Variables	Values [a]	*p-Value* [b]	Odds Ratio	95% CI
Age	0.052	*<0.001*	1.054	(1.0279-1.0803)
APACHE II SCORE	0.118	*0.012*	1.125	(1.0260-1.2339)
SOFA Score	0.507	*<0.001*	1.660	(1.3368-2.0622)
CRP (mg/dL)	0.059	*0.013*	1.060	(1.0122-1.1106)
PFR	-0.012	*0.015*	0.988	(0.9789-0.9977)
eGFR	-0.031	*0.019*	0.970	(0.9448-0.9950)
Final Disposition Severity	2.320	*<0.001*	10.178	(4.6162-22.4411)

One study of 425 patients with COVID-19 indicated that 56% were males.[9] Another study of 140 patients found that 50.7% were also males.[10] In a recent study, similar susceptibility to SARS-CoV-2 between males and females was observed in 1,019 patients who survived the disease (50.0% males), collected from a public data set and in a case series of 43 hospitalized patients (51.2% males). Although the deceased patients were significantly older than the patients who survived COVID-19, ages were comparable between males and females in both the deceased and the patients who survived. Therefore, gender is a risk factor for higher severity and mortality in patients with COVID-19, independent of age and susceptibility.[11] According to the WHO Philippines Coronavirus Disease Situation Report September 2020, out of the total 47,873 confirmed cases reported in the Philippines until today, 56% are male, with the most affected age group of 30-39 years (23.7%) followed by 20-29 years (22.6%). Out of the 1,309 confirmed deaths, 62% are male, with the most affected age group over 70 years (34.7%) followed by 60-69 years (29.2%).[4]

The main clinical symptoms of COVID-19 patients were fever (88.5%), cough (68.6%), myalgia or fatigue (35.8%), expectoration (28.2%), dyspnea (21.9%). Minor symptoms include headache or dizziness: (12.1%) diarrhea (4.8%), nausea, and vomiting (3.9%). The laboratory results showed that the lymphocytopenia (64.5%), increase of CRP (44.3%), increase of LDH (28.3%), and leukocytopenia (29.4%) were more common.[12]

Circulatory and endocrine comorbidities were common among patients with COVID-19. Patients with at least one comorbidity, or even more, were associated with poor clinical outcomes. A meta-analysis of the comorbidities suggested that hypertension was prevalent in approximately 21.1% of the patients; diabetes, cardiovascular disease, and respiratory system disease were present in 9.7%, 8.4%, and 1.5% of the cases, respectively. Hypertension and diabetes mellitus consistent with the prevalence of hypertension and diabetes in China were 23.2%.[13] Chronic diseases share several standard features with infectious disorders, such as the proinflammatory state, and the attenuation of the innate immune response.

Sepsis is defined as documented (or suspected) infection and presence of 2 or more sepsis related organ failure assessment (SOFA) points. SOFA score is scored with up to 4 points accumulated across six organs with range from 0 to 24 points.[14] There may be a ≥10% risk of in-hospital death in patients with ≥2 new SOFA points. In a retrospective multi-cohort study Zhou, F. (2020) involving 171 patients using multivariable logistic regression

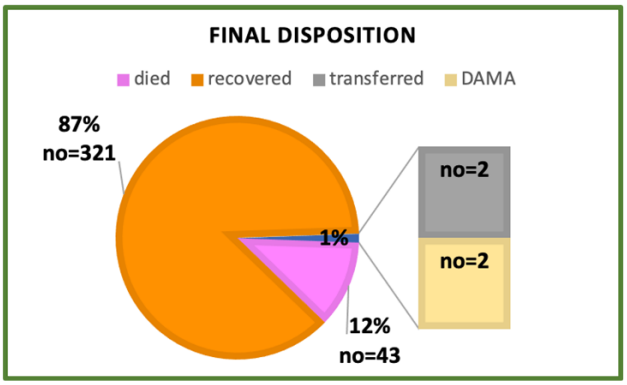

Figure 3.1. Hospital Outcomes of COVID-19 Patients

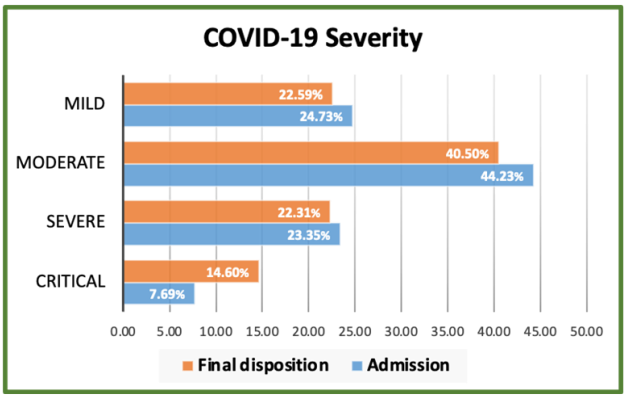

Figure 3.2 Severity of COVID-19 Patients

model for all variables (53 non-survivors and 118 survivors) showed that older age, higher SOFA score, and d-dimer greater than 1 µg/L at admission were associated with increased odds of death.[15]

Acute Physiology and Chronic Health Evaluation II (APACHE II) scoring system is the most used severity of illness (SOI) scoring system. Age, type of ICU admission, (after elective surgery vs nonsurgical or after emergency surgery) chronic health problems, and 12 physiologic variables (the worst values for each in the first 24 hours after ICU admission) are used to derive a score.[14,16] In a study by Assaf (2020) included a total of 6995 COVID19 patients showed APACHE II median score for critical versus noncritical is 6 and 10 respectively.[17]

Guan et al. provided data on the clinical characteristics of 1,099 COVID-19 cases with laboratory confirmation during the first two months of the epidemic in China.[18] On admission, most patients presented with lymphocytopenia (83.2%), whereas 36.2% had thrombocytopenia, and 33.7% showed leukopenia. These hematological abnormalities were more prominent among severe versus non-severe cases (96.1% versus 80.4% for lymphocytopenia, 57.7% versus 31.6% for thrombocytopenia and 61.1% versus 28.1% for leukopenia). Increased CRP, lymphopenia, and increased LDH were reported in seven studies.[19,20]. These seven studies where patients were divided into the non-severe and severe groups, were selected for a subgroup meta-analysis of proportion and risk analysis between the severe and non-severe groups. The results showed that increased CRP (OR=3.0, 95% CI: 2.1–4.4), lymphopenia (OR=4.5, 95% CI: 3.3–6.0), and increased LDH (OR=6.7, 95% CI: 2.4–18.9) were highly associated with severe conditions. Zhou *et al*. found that the ratio of lymphopenia in the non-survivor group was higher than that in the survivor group (76% vs. 26%, $p < .001$), and the proportion of increased LDH in the non-survivor group was higher than that in the survivor group (98% vs. 54%, $p < .001$).[21] Accordingly in a retrospective cohort study including 191 patients with COVID-19 from Wuhan, China, non-survivors, as compared with survivors, presented more often with high LDH ($p<0.0001$).[22] Higher CRP has been linked to unfavorable aspects of COVID-19 disease, such as ARDS development, higher troponin-T levels and myocardial injury and death.[23] A meta-analysis of four published studies showed that increased procalcitonin values were associated with a nearly 5-fold higher risk of severe infection. Regarding ferritin, Wu et al. showed that higher serum ferritin was associated with ARDS development (HR=3.53, 95%CI: 1.52-8.16, p=0.003); the trend of an association with survival did not reach significance (HR=5.28, 95%CI: 0.72-38.48, p=0.10).20 At their univariate analysis, Zhou et al. supported an association between higher serum ferritin levels and death, but no multivariate analysis was presented.[23]

Chest radiography typically shows patchy or diffuse asymmetric airspace opacities, like other causes of coronavirus pneumonias.[24] The first report of patients with COVID-19 described bilateral lung involvement on initial chest CT in 40 of 41 patients, with a consolidative pattern seen in patients in the ICU and a predominantly ground-glass pattern in patients who were not in the ICU. An investigation of initial chest CT findings in 21 individuals with confirmed COVID-19 reported abnormal findings in 86% of patients, with a majority (16/18) having bilateral lung involvement.[25] Multifocal ground-glass opacities and consolidation were reported in 57% and 29%, respectively, with a peripheral lung predilection. Although the imaging features closely resemble those of MERS and SARS, involvement of both lungs on initial imaging is more likely to with COVID 19.[26]

Despite the worsening trends of COVID-19, no drugs are validated to have significant efficacy in clinical treatment of COVID-19 patients in large-scale studies.[27] Remdesivir is considered the most promising antiviral agent; it works by inhibiting the activity of RNA-dependent RNA polymerase (RdRp). A large-scale study investigating the clinical efficacy of remdesivir (200 mg on day 1, followed by 100 mg once daily) is on-going. The other excellent anti-influenza RdRp inhibitor favipiravir is also being clinically evaluated for its efficacy in COVID-19 patients. The protease inhibitor lopinavir/ritonavir (LPV/RTV) alone is not shown to provide better antiviral efficacy than standard care.[27]

In a case series by Richardson involving 2634 patients who were discharged or had died at the study end point, during hospitalization, 14.2% were treated in the ICU,

12.2% received invasive mechanical ventilation, 3.2% were treated with kidney replacement therapy, and 21% died.[28]

In this study, men in their old age with a history of hypertension and diabetes, who are smokers and living in Cebu City were the ones mostly infected with COVID-19. This was in concordance with the study done by Li et al in Wuhan, China which showed median age of 59 years old (range 15 to 89) and 56% were male.[29] One study of 425 patients with COVID-19 indicated that 56% were males.[9] Another study of 140 patients found that 50.7% were also males.[10] In a recent study, similar susceptibility to SARS-CoV-2 between males and females was observed in 1,019 patients who survived the disease (50.0% males), collected from a public data set and in a case series of 43 hospitalized patients (51.2% males). Therefore, sex is a risk factor for higher severity and mortality in patients with COVID-19, independent of age and susceptibility. This sex factor, as well as higher incidences in men for most of the diseases, could correlate with a general demographic fact of a shorter life expectancy in men compared to women. SARS-CoV-2 and SARS-CoV attack cells via the same receptor, angiotensin converting enzyme (ACE 2) and it has been shown that circulating ACE 2 levels are higher in men than in women and in patients with diabetes or cardiovascular diseases. Men with COVID-19 are more at risk for worse outcomes and death, independent of age.[11]

Based on the data, the majority of those affected have an uncertain history of exposure. One third got the disease from residential areas with local transmission followed by those who travel to an area with local transmission. Khan et al observed that positive contact history/exposure has been shown to have strong predictive value for mortality as supported by regression analysis and accounted for variability of 1.1% in the cases of mortality.[30] Interestingly, most of the respondents claimed that they were uncertain about their exposure history which recorded more than half of these patients.

In terms of the clinical profile, most of the patients in this study had comorbidities with hypertension being the most prevalent, then followed by diabetes. In comparison to this study, Salacup, McCarthy, Hussain revealed hypertension and diabetes as top predominant comorbidities and the former as the most common.[31-33] A meta-analysis of the comorbidities suggested that hypertension was prevalent in approximately 21.1% of the patients; diabetes, cardiovascular disease, and respiratory system disease were present in 9.7%, 8.4%, and 1.5% of the cases, respectively. Hypertension and diabetes mellitus consistent with the prevalence of hypertension and diabetes in China were 23.2%.[13] Chronic diseases share several standard features with infectious disorders, such as the proinflammatory state, and the attenuation of the innate immune response.

Significant in this study is that it revealed that all our admitted patients are smokers and everyone that expired had a smoking history. Smoking has been reported to be a risk factor for developing acute respiratory distress syndrome (ARDS) and is associated with higher intensive care costs.[35] In one recent study, ACE-2 gene expression was upregulated in the airway epithelium of smokers, thereby suggesting a mechanism by which risk for severe COVID-19 increases in smokers.[36] Smokers are more prone to more severe infections due to poor mucociliary clearance and an exaggerated cellular response marked by oxidative stress, increased permeability, mucus overproduction, and release of pro-inflammatory cytokines.[61] Smokers are therefore more likely to develop ARDS and do worse with respiratory diseases owing to a lowered pulmonary reserve and altered physiology.

The commonly manifested presentations in this study were cough, fever, dyspnea, and fatigue. The least commonly reported symptoms were nausea and vomiting, nasal congestion, and anosmia. In a retrospective study by Yang et al with 124 participants, the most frequent symptoms were fever followed by shortness of breath, fatigue, and cough. The initial symptoms were consistent in both studies.[38] Nonetheless, there is still a need to consider COVID-19 in some cases in which febrile respiratory illness is not prominent.

The mean values of the vital signs of the patients in this study were within normal range except for the mean respiratory rate which was tachypneic (24 cycles per minute). A retrospective study by Sands et al, showed that patients presented at admission with a temperature above 38°C which contrasted with our findings.[39] Both studies had a majority with an admitting respiratory rate <24 and O_2 saturation of >90%. In a study by Ran et al., patients had normal BP on admission (SBP/DBP < 140/90 mmHg) and the mean SBP and DBP on admission were 137.0 mmHg and 84.2 mmHg respectively.[40] These findings were consistent with the results of our study. The vital signs of the survivors and expired groups in our study were almost identical.

In our study, the severity of illness of the admitted COVID-19 patients using APACHE II had a low mean score of 8.75. The APACHE II score (13.9) for our expired patients was higher compared to the alive group. In a retrospective observational cohort study by Zou et al, mean APACHE II score (23.23 ± 6.05) was much higher in deaths compared with a score of 10.87 ± 4.40 in survivors ($p < 0.001$).[41] In a study by Assaf (2020) included a total of 6995 COVID19 patients showed APACHE II median score for critical versus noncritical is 6 and 10 respectively.[17]

Acute Physiology and Chronic Health Evaluation II score was independently associated with hospital mortality. In terms of organ dysfunction, sequential organ failure assessment score (SOFA score) showed a score of 2.23 which is associated with an in-hospital mortality greater than 10%. This result suggests that a SOFA score ≥ 2 can predict the severity of COVID-19 patients. In our study, the average SOFA score of the patients who died was 5.58 indicating a significantly higher risk of death. Based

on this study, the median scores for inflammatory markers (LDH, CRP, ferritin, D-dimer) were elevated except for procalcitonin. Regarding ferritin, Wu et al. showed that higher serum ferritin was associated with ARDS development (HR=3.53, 95%CI: 1.52-8.16, p=0.003); the trend of an association with survival did not reach significance (HR=5.28, 95%CI: 0.72-38.48, p=0.10).[20] At their univariate analysis, Zhou et al. supported an association between higher serum ferritin levels and death, but no multivariate analysis was presented.[23] In a pooled analysis done by Henry, et al., morbid patients presented with elevated LDH values[42] This result is consistent with our study which showed that the median LDH is elevated at 293 U/L. Elevated LDH values were found to be associated with an increased odd of severe COVID-19 outcome which was evident with the elevated values for LDH (526) in the expired patients included in our study. Wang et.al., pointed out that in his study that compared with non-severe patients, aggravated patients had much higher levels of CRP.[43] This is in also seen in the elevated CRP values of the mortalities. In addition, median ferritin and D dimer levels were also significantly elevated as these markers are features of hyperinflammation associated with COVID-19 and these values were remarkably elevated in the group of patients in our study that expired.

The findings on Chest X rays and Chest CT scan showed that more than half of the patients presented with infiltrates and ground glass opacities respectively; more than a third with consolidation and more than a tenth with effusion for both imaging. This is consistent with what is constantly reported in literature, as cited by Rousan et al, reporting that half of COVID-19 patients have abnormal radiographic presentation of bilateral infiltrates, and bibasal ground glass opacities.[44]

An investigation of initial chest CT findings in 21 individuals with confirmed COVID-19 reported abnormal findings in 86% of patients, with a majority (16/18) having bilateral lung involvement.[25] Multifocal ground-glass opacities and consolidation were reported in 57% and 29%, respectively, with a peripheral lung predilection. Although the imaging features closely resemble those of MERS and SARS, involvement of both lungs on initial imaging is more likely with COVID-19.[26]

The most common antibiotic given was Azithromycin. On the other hand, most frequently used intravenous antibiotics were Piperacillin+tazobactam followed by Ceftriaxone. The choice of antibiotics by attending physicians were basically based on the local pneumonia guidelines thus the prevalence of these antibiotics in our study. Likewise, Lopinavir-ritonavir followed by Favipiravir were the common antiviral medications administered to the COVID-19 patients. This can be explained because most of our patients included those admitted in the month of March to May and during this time, Lopinavir+ritonavir were the recommended antivirals to be used before they were abolished and replaced with Favipiravir in the succeeding months.

In this study, the most widely used agent to address the hypercoagulability state in COVID-19 was enoxaparin followed by rivaroxaban. Griffin et al did find that anticoagulation is associated with a decrease in mortality rates for COVID-19 patients, specifically using enoxaparin.[45] However, the use of anticoagulant did not significantly alter the course of our expired patients as evidenced by the majority of our expired patients also being given the medication.

In this study, 30.43% of admitted patients received tocilizumab, while Interferon and IVIg were rarely given at 0.27% and 2.45% respectively. Majority (88 out of 112) of the patients included in our study who took Tocilizumab recovered and were discharged, while for the IVIg group, more than 50% (5 out of 9) of patients who were given IVIg did not survive. Out of the 368 patients included in the study, only 3.26% (n=12) had undergone convalescent plasma transfusion. One of the major factors why not all patients were able to receive this therapy is the availability of the plasma and the financial status of the patient.

In this study, supplemental oxygen therapy was given to more than half of the population; only 10.6% (n=39) was placed on mechanical ventilation. A study done by Myers et al., reported more than 70% of the critically ill Covid-19 patients received intubation and invasive mechanical ventilation support. Moreover, among the intubated patients included in the study, 5.16% (n=19) was sedated with Midazolam and 4.35 % (n=16) had neuromuscular blockade. Both sedation and neuromuscular blockade is empirical to provide adequate ventilatory support for the intubated patients.[46]

Furthermore, intubation seemed to pose greater risk for morbid patients as 29 out of the 39 (67%) intubated in our study became more severe and died. Deciding when to intubate and mechanically ventilate a patient with respiratory failure is a complex decision based on both patient disease severity and provider judgment and may have significant implications for patient outcomes. Mechanical ventilation compounded with a delay has been associated with worsened clinical outcomes in ARDS. High respiratory drive leading to self-induced lung injury (SILI) has been posited as a potential mechanism underlying these observations.[47]

In this institution, only 22% of patients with COVID-19 were placed in a prone position and 53 out of the 82 patients who were placed on prone position during admission were discharged alive. The main mechanisms of prone position in improvement of ARDS in COVID patients are affecting recruitment in dorsal lung regions, increasing end-expiratory lung volume, increasing chest wall elastane, decreasing alveolar shunt, and improving tidal volume.[48] Some factors that could have led to the minimal adherence were lack of skilled healthcare workers and lack of training on the proper mechanics of proning.

Ten percent of all admitted COVID-19 patients in our study underwent hemodialysis. A report by Jager et al from the European Renal Association - European Dialysis

and Transplant Association (ERA-EDTA) Registry highlighted the impact of COVID-19 on patients with kidney failure and noted an approximately 20% mortality rate due to COVID among patients receiving dialysis. In 3% of the patients admitted for COVID in this study, hemoperfusion was used as an adjunctive treatment strategy. This study also revealed that acute kidney injury was the commonly noted complication during admission and compounded by respiratory failure as the primary cause of death.

Current evidence suggests that AKI in COVID-19 patients is a result of an interplay of virus-mediated injury, a dysregulated inflammatory response, angiotensin II pathway activation, hypercoagulation, and microangiopathy. These complications were noted to be comparably evident in both the alive and expired groups of our study. In this study, majority of the final dispositions of COVID-19 admitted patients has recovered (87%) while 12% of the patients died. It also showed both in the admission and final disposition, majority of the patients were classified as moderately severe. It should also be noted that deaths increased upon final disposition for critically-ill patients. In a study by Mc Carthy (2020) composed of 247 patients with COVID19 infection revealed majority were alive (86%), and 13% expired. Li et.al reported a meta-analysis involving 432 cases showed discharge rate of the COVID-19 patients was 52% and another meta-analysis with 1560 cases had a fatality rate at 5%.[31]

Conclusion

In this study, COVID19 confirmed patients were predominantly elderly male with comorbidities, and smokers. Smoking was found to be significantly associated with mortality. The usual initial presentations were cough, fever, dyspnea, and initial vital signs were unremarkable. However, increase in inflammatory markers was associated with increased mortality. Initial imaging findings did not correlate with the outcome of admitted patients and medications used in the study did not show a clear benefit in increasing survival of infected patients. Although diffuse alveolar damage and respiratory failure are the key features of COVID-19, the involvement of other organs such as the kidney has also been well reported in our patients and the usual cause of mortality is respiratory failure.

Recommendations

Based from the findings in this study, we recommend to practice appropriate health and safety protocols especially in the high-risk population group like those with comorbidities and smokers. It is important to inculcate and implement preventive measures like social distancing, wearing of face masks to prevent complications from the disease. We recommend that future researches will be able to conduct multi center studies to gather robust data of other institutions on the sociodemographic profile, clinical characteristics, and outcomes of their admitted COVID-19 patient so it can supplement in reflecting the real picture of COVID-19 in Cebu. Furthermore, we recommend that further studies focus on sub analysis of other variables such as timing of ventilation, nutritional support, ventilatory management and many more that can help in improving our management of COVID-19 patients.

Conflict of Interest. The authors declared that there is no conflict of interest.

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