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Clinical profile of COVID-19 patients and factors impacting mortality in a rural tertiary care center of Solapur

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ABSTRACT

Background: A retrospective and cohort study was conducted in our center to study the parameters among surviving and non-surviving patients that have a significant impact on in hospital mortality. Along with this, demographic and clinical profile was also studied. **Aims and Objectives:** The aim of this study was to evaluate clinical profile of COVID-19 patients and factors impacting mortality. **Materials and Methods:** The present study is a single-center, retrospective, and cohort study done on COVID-19 positive (by real-time polymerase chain reaction) patients admitted between May 2019 and June 2021 in the intensive care unit (ICU). Of the total 1694 patients, 422 required ICU treatment and the remaining 1272 patients were treated in wards and rooms and discharged home. The analysis was based on demographic, clinical, associated comorbidities, laboratory and radiological data, and treatment modalities used. Outcome data were analyzed by regression analysis and the Kaplan–Meir survival plot was used to calculate mortality trend. **Results:** Of the 422 patients, 158 (37.4%) died and 264 (62.6%) survived. Males predominated with 297/422 (70.4%). ICU admissions comprised 115/158 (72.8%) of the total deaths. Fever (88%), dyspnea (78.48), and cough (67.1%) were the most common symptoms in non-survival group. Hypertension (43.7%) and diabetes (37.3%) were the most common comorbidities. High oxygen (>10 L/min) ($P<0.0001$), invasive ventilation ($P<0.0001$), noradrenaline infusion $P<0.0001$), renal replacement therapy ($P<0.0001$) and tocilizumab requirement ($P<0.0001$), procalcitonin ($P<0.009$) and interleukin-6 ($P<0.004$) acute respiratory distress syndrome (ARDS) with septic shock, and multiorgan failure ($P<0.0001$), all indicated higher risk of death. **Conclusion:** Mortality was 37.4% in our study. Elderly age (>60 years), high serum ferritin (>931.9), and severe disease with a high resolution computed tomography score (>15), ARDS with septic complications requiring invasive ventilation and vasopressor support, are associated with increased mortality in these patients.

Key words: COVID-19; Comorbidities; Mortality factors; Risk factors; Treatment pattern

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INTRODUCTION

Since the detection of COVID-19 coronavirus in Wuhan in China in 2019, this world has seen pandemic causing tsunamis of this illness.[1] The World Health Organization (WHO) declared the coronavirus disease (COVID-19) as a global pandemic on March 11, 2020.[2] In India, the disease was first detected on January 30, 2020, in Kerala in a student who resided in Wuhan.[3,4] This simple-looking pneumonia in no time embroiled the world with its deadly virulence and engulfed millions of human beings worldwide in a span of two and a half years and caused excess mortality[5,6] The effects of the pandemic look wearing off but its effect on humanity is sure to last for long. During this pandemic, daily millions of people got infected and hordes of patients struggled to get admitted in hospitals where the medical facilities were already overwhelmed with loads of ailing patients. Hospitals in the world with the best medical

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facilities looked crampled with this unknown disease with a paucity of medical personnel, staff, medicines, machines, and lifesaving oxygen.[7] Situating in developing countries like India was more grave. Doctors here faced an unprecedented situation of treating COVID-19 patients with their limited resources and infrastructure with a huge pressure to give their best practice and save lives of the maximum possible patients. We all overworked for months together with these tough circumstances and did our duties with those energy-drenching PPE kits. Situation in the interiors of our country was all the more pathetic to tackle this resource-demanding illness.[8,9] High mortality was suspected with male gender, age >50–60 years, hypertension, diabetes, obesity, chronic heart, kidney, and lung disease as India has a high burden of such cases. With this background, we aimed to conduct a retrospective study of 422 COVID-19-positive cases admitted in our intensive care unit (ICU) of the total 1694 indoor cases; we treated between May 01, 2019, and June 30, 2021.

Aims and objectives

The objectives of the study are as follows:

1. To study the demographic and clinical profile of patients admitted with COVID-19 disease
2. To determine the factors and comorbidities impacting mortality in these patients.

MATERIALS AND METHODS

This study included all adult patients (age >18 years) admitted between May 2019 and June 2021 in our hospital. Of the total 1694 cases, whose nasopharyngeal secretions or endotracheal secretions were positive for COVID-19 by real-time polymerase chain reaction (RT-PCR), 422 patients having moderate-to-severe illness and admitted to ICU were selected for the study. Investigations and COVID markers done at the time of admission were compared among the group of patients who survived and those who succumbed. Outcome was measured by either the survival or death of the patient.

The Ethical Committee approval was taken before begin of this study (IEC no: ARMCH/ECHR/03/2022, dated 08/02/2022). Written informed consent was waived since it is a retrospective and observational study.

Inclusion criteria

The following criteria were included in the study:

1. Age >18 years
2. Confirmed cases of COVID-19 by RT-PCR method of nasopharyngeal or throat swab.
3. Moderate to severely ill patients who were admitted in ICUs.

Exclusion criteria

The following criteria were excluded from the study:

1. Age <18 years
2. Patients who were shifted to higher centers
3. Patients who refused treatment and had do not resuscitate orders.

Data collection procedure

The relevant clinical, laboratory, radiological, treatment, and outcome data were collected from our record section for all these patients in a standardized format. On admission history, demographic profile, routine investigations such as complete blood count, random blood sugar, liver function test, renal function test, X-ray chest, high resolution computed tomography (HRCT chest) arterial blood gases, electrocardiogram (ECG), 2D echocardiography, inflammatory markers such as D-dimer, serum ferritin, lactate dehydrogenase (LDH), interleukin-6 (IL-6), and C-reactive protein (CRP) and biochemical tests were done. Blood cultures, serum galactomannan, and procalcitonin (PCT) were done as and when required.

Operational definition

Fever was defined as an axillary temperature above 37.3*C. Sepsis and septic shock were defined according to the 2016 third international consensus definition for sepsis and septic shock.[10] Acute respiratory distress syndrome (ARDS) was defined according to the Berlin definition[11] and acute kidney injury according to the RIFLE criteria.[12] Cardiac injury was defined by the elevation of cardiac biomarkers above the upper limits of normal or new abnormalities detected on ECG or Echocardiography. CVD was considered if the patient had a previous myocardial infarction, LVF, or ischemic heart disease (IHD).[13] Diabetes was defined if the patient was on medication or hemoglobin A1c was >6.5 within 3 months or at the time of admission or random sugar was >200 mg/dL.[14] Hypertension was defined if the patient was already on medications or if admission blood pressure was >140/90 mm hg. Chronic liver disease (CLD) if the patient had cirrhosis or liver cell failure of any cause, hypothyroidism if the patient was on treatment or TSH >10 IU.

Patients were treated in ICU as per the WHO and Indian COVID treatment Guidelines.[15] Patients were given corticosteroids, remdesivir, and supplemental oxygen to maintain SPO_2 at 90% or above, high flow nasal oxygen, non-invasive ventilation (NIV), or mechanical ventilation if required, low molecular weight heparin in prophylactic doses, IV antibiotics where appropriate according to culture reports, tocilizumab in cases with cytokine storm. Patients who improved were shifted to high-dependency units or wards, and those who turned negative were transferred to non-COVID ICUs or wards for further care.

Statistical analysis

Continuous variables were expressed as median and interquartile (IQR), whereas categorical variables were expressed as numbers and percentages. The Student's t-test was applied for normally distributed continuous variables and the Mann–Whitney U-test for non-normally distributed variables. Categorical variables were compared with the χ^2 test or Fisher's exact test. All parameters that might affect on deaths were screened by univariable analyses. The variables that reached significance were further tested by logistic regression analyses. P<0.05 was considered statistically significant. Data were analyzed with SPSS software v 24.0 (2016).

RESULTS

The total number of patients included in this study was 422 ICU patients admitted during May 2019–June 2021. Among these patients, 158 (37.4%) died and 264 (62.6%) survived and were discharged.

In the present study, fever was the most common presenting symptom in both age groups, with 223 (84.5%) patients in the survivors group and 139 (88%) in non-survivors group, followed by dyspnea in 119 (45%) survivors and 124 (78.48%) non-survivors whereas with cough in 186 (70.5%) survivors and 106 (67.1%) non-survivors (Table 1).

In the gender group analysis, males predominated with 182 (68.9%) patients in the survival group and 115 (72.8%) in non-survival group, with 82 (31.1%), and 43 (27.2%) females, respectively, in these two groups. While young patients of both sexes between the age groups of 40–60 years predominated the surviving group with 110 (41.7%) in numbers, elderly patients aged 60–80 years predominated with 76 (48.1%) among non-survivors group. Almost half the mortality (48.1%) was beared by this group. The mean age was 55.3 years in survivors and 61.5 years in patients who died (Table 2).

When compared comorbid characteristics between groups, it was found that hypertension 85 (32.2%) versus 69 (43.7%), diabetes 84 (31.8%) versus 59 (37.3%), COPD/Asthma 8 (3%) versus 9 (5.7%), chronic kidney disease (CKD) 8 (3%) versus 7 (4.4%), and CLD 2 (0.8%) versus 3 (1.9%) were higher in non-survivors whereas IHD with 40 (15.2%) versus 21 (13.3%) and cerebrovascular accident (CVA) in 7 (2.7%) versus 4 (2.5%) were slightly higher in survivors (Table 3).

The majority of surviving patients required oxygen between 2 and 10 L/min and non-survivors required between 6 and 25 L/min of oxygen.

During treatment among non-survivors 52/158, (32.9%) of patients were put on invasive ventilators whereas among survivor, maximum were put on non-invasive mask ventilation 171/264 patients (64.8%) (Table 4).

Survivors received more antibiotics (n=261/264, 98.9%), favipiravir (n=20/264, 7.6%), and prone position (n=224/264, 85.2%) as compared to non-survivors, who received comparatively more therapy with heparin (n=156/158, 96.2%) support with noradrenaline (n=134/158, 84.8%) and dialysis (n=21/158, 13.3%) and intravenous steroids (156/158, 98.7%), remdesivir (124/158, 78.5%), and tocilizumab (62/158, 39.7%) (Table 5).

For comparison of laboratory parameters, it was observed that non-survivors showed increased values of hemoglobin (Median 12.9, IQR 11.2–14.2), TLC (Median 11.8, IQR 8.4–17.4), creatinine (Median 1.3, IQR 1.0–1.8), serum sodium (Median 137, IQR 132–141), serum potassium (Median 4.2, IQR 3.6–4.7), HRCT score (Median 18, IQR 15–19.8, Alkaline Phosphatase (Median 80, IQR 59–105, SGOT (Median 50, IQR 36–72.8), SGPT (Median 47, IQR 33–66.5), and PCT (Median 0.29, IQR 0.1–1.24). Furthermore, inflammatory markers had higher values in non-survivors, namely, D-Dimer (Median 1501, IQR 842.5–3342), serum ferritin (Median 931.9, IQR 438–1286), CRP (Median 95.64, IQR 49-151), LDH (Median 566, IQR 416–841), and interleukin (Median 108.7, IQR 37.2–358.6) as compared to survivors.

There is significant difference that was observed between groups in hemoglobin (P=0.03), total leukocyte count (P<0.001), creatinine (P<0.001), serum potassium (P=0.002), HRCT score (P<0.001), conjugated bilirubin (P=0.002), alkaline phosphatase (P<0.001), serum glutamic oxaloacetic transaminase (P=0.05), PCT (P=0.009), D-dimer (P<0.001), serum ferritin, LDH (P<0.001), and interleukin-6 (P=0.004) (Table 6).

In the present study for complications and causes of death among the non-survivors, most died due to primary respiratory failure (76.6%) followed by adult respiratory distress syndrome (74.7%). Septic shock (45%), cardiac failure (15.2%), and acute kidney injury (27.8%) as compared to survivors. Average hospital stay was higher in survivors (11.8 days) then non-survivors (9.8 days) (Table 7).

When risk factors for COVID-19 death were calculated by logistic regression analysis, age, invasive ventilation noradrenaline, renal replacement therapy, HRCT score, and serum ferritin were found to be significant in our study (P<0.0001). NIV (P=0.005) and total leukocyte count (P=0.002) were also statistically significant (Table 8).

Table 1: Distribution of initial symptoms

Initial symptoms	Survivors (%) (n=264)		Non-survivors (%) (n=158)		Number	P-value
Fever	223	84.5	139	88.0	362	0.32
Abdominal pain	3	1.1	1	0.6	4	0.60
Bodyache	7	2.7	2	1.3	9	0.34
Dyspnoea	119	45.0	124	78.48	243	0.44
Chest pain	4	1.5	2	1.3	6	0.83
Cough	186	70.5	106	67.1	292	0.47
Facial Puffiness	0	0.0	1	0.6	1	0.44
Giddiness	1	0.4	2	1.3	3	0.29
Headache	3	1.1	0	0.0	3	0.29
Hematemesis	0	0.0	1	0.6	1	0.4
Loose motions	4	1.5	3	1.9	7	0.76
Vomiting	1	0.4	1	0.6	2	0.71
Cold	26	9.8	8	5.1	34	0.08
Loss of smell	1	0.4	1	0.6	2	0.71
Loss of taste	4	1.5	0	0.0	4	0.3
Weakness	3	1.1	3	1.9	6	0.52

Table 2: Baseline characteristics

Characteristics	Survivors (%) (n=264)		Non-survivors (%) (n=158)		Number	P-value
Age (years)	55.3±15.8	(13–92)	61.5±13.2	(22–88)	422 (100)	<0.0001
Age groups (years)						
<20	3	1.1	0	0	3 (0.7)	0.45
21–40	48	18.2	12	7.6	60 (14.2)	0.004
41–60	110	41.7	59	37.3	169 (40)	0.44
61–80	93	35.2	76	48.1	169 (40)	0.01
>80	10	3.8	11	7.0	21 (5.0)	0.22
Sex						
Female	82	31.1	43	27.2	125 (29.6)	0.40
Male	182	68.9	115	72.8	297 (70.4)	

Table 3: Underlying diseases

Underlying diseases	Survivors (%) (n=264)		Non-survivors (%) (n=158)		Number	P-value
Hypertension	85	32.2	69	43.7	154 (36.5)	0.02
Diabetes	84	31.8	59	37.3	143 (33.9)	0.25
COPD/asthma	8	3.0	9	5.7	17 (4.0)	0.18
Chronic kidney disease	8	3.0	7	4.4	15 (3.6)	0.45
Chronic liver disease	2	0.8	3	1.9	5 (1.2)	0.29
Ischemic heart disease	40	15.2	21	13.3	61 (14.5)	0.59
Cerebrovascular accident	7	2.7	4	2.5	11 (2.6)	0.99
Hypothyroidism	5	1.9	5	3.2	10 (2.4)	0.51

Table 4: Oxygen therapy

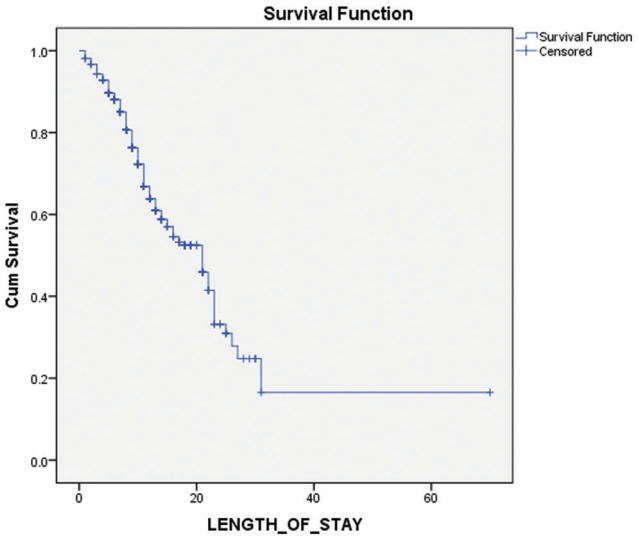
Oxygen therapy	Survivors (%) (n=264)		Non-survivors (%) (n=158)		Number	P-value
O_2 therapy type						
O_2 by mask	43	16.3	10	6.3	53 (12.6)	0.005
Invasive ventilation	10	3.8	52	32.9	62 (14.7)	<0.0001
High flow nasal Oxygen	40	15.2	23	14.6	63 (14.9)	0.98
Non-invasive ventilation	171	64.8	73	46.2	244 (57.8)	0.0003
Oxygen (l)						
≤2	57	26.6	15	9.9	72 (17.1)	0.002
3–5	46	21.5	13	8.6	59 (14.0)	0.01
6–10	46	21.5	43	28.5	89 (21.1)	0.02
11–15	51	23.8	59	39.1	110 (26.1)	<0.0001
16–20	2	0.9	3	2.0	5 (1.2)	0.56
>20	12	5.6	18	11.9	30 (7.1)	0.01

Table 5: Treatment pattern

Treatment pattern	Survivors (%) (n=264)		Non-survivors (%) (n=158)		Number	P-value
Antibiotics	261	98.9	156	98.7	417 (98.8)	0.90
Heparin	253	95.8	152	96.2	405 (96.0)	0.85
Favipiravir	20	7.6	6	3.8	26 (6.2)	0.12
Noradrenaline	15	5.7	134	84.8	149 (35.3)	<0.0001
Renal replacement therapy	6	2.3	21	13.3	27 (6.4)	<0.0001
Prone position	224	85.2	115	72.8	339 (80.5)	0.002
Hydroxychloroquine	6	2.3	11	7.0	17 (4.0)	0.02
Remdesvir	202	76.5	124	78.5	326 (77.3)	0.64
Cortico steroids	243	92	156	98.7	399 (94.5)	0.003
Tocilizumab	39	15	62	39.7	101 (24.3)	<0.0001

In the present study, mortality due to COVID-19 was 37.4% (Table 9).

The overall median length of stay for COVID-19 patients to death was 21 days (95% CI: 17.6–24.3) (Table 10).



The Kaplan–Meier plot showed a trend toward poorer survival in COVID-19 patients with an increase in length of stay. The drops in the survival curve occur whenever death occurs. Thus, any point on the survival curve shows the probability on a given treatment will not have experienced relief by that time.

DISCUSSION

In the present study, 422 patients admitted for COVID-19 treatment, of which 264 (62.6%) survived and 158 (37.4%) died.

Mean age was 55.3±15.8 years in survivors and 61.5±13.2 years in non-survivors, which shows statistically significant (P<0.0001). Although sex was not shown statistically significant (P=0.4), males predominated in both groups with 68.9% survivors and 72.8% non-survivors.[16,17] Furthermore, mortality in older males was higher in our study which is similar findings to previously reported studies.[18] Eighty seven patients who died were older than 60 years with 76 (48.1%) of non-survivors were between age 60 and 80 years. Twenty one patients were >80 years of age and 11/21 (52.38%) of them died. This in turn indicates, more than half of dying population 87/158 (55%) comprised elderly people. Most of the studies done previously have reported similar findings.[19,20]

Fever (85.78%) was the most common presenting feature in the present study followed by cough (69.19%) and dyspnea.[16,21] (57.58%) in both the sub groups.[22] All these symptoms were more severe in non-surviving group. These symptoms being the cardinal features of COVID-19 infection helped in early detection of disease and hence timely treatment. The symptoms in the present study match with the previous studies.[23,24] Patients not having these features were late in testing and diagnosis that add to the severity of illness.

Among the comorbid conditions in non-survivors, diabetes (43.7%), hypertension (37.3%), and IHD (13.3%) were the most common associations.[25,26] Non-survivors had a higher incidence of these diseases compared to survivors. Although these diseases have a severity and mortality impact on COVID-19 illness course; it did not show statistically significant in the present study. Similar was the case with pre-existing lung diseases such as chronic obstructive pulmonary diseases bronchial asthma and interstitial lung diseases. Low prevalence in our study group and acute causes of death such as sepsis and respiratory failure could have masked their effects.[27]

The average requirement of oxygen was expectedly higher in the non-surviving group.[28] Among the respiratory system support required, patients were applied with prone position, high-frequency nasal oxygen, and non-invasive and invasive ventilators. Ventilation and low oxygen saturation adversely impacted the mortality,[21,29] with invasive ventilation being significant statistically (P<0001) as a risk factor for death in regression analysis. NIV averted many patients going to

Table 6: Comparison of laboratory parameters between surviving and non-surviving groups

Laboratory parameters	Survivors (n=264)		Non-survivors (n=158)		P-value
	Median	IQR	Median	IQR	
Hemoglobin	12.3	10.8–13.6	12.9	11.2–14.2	0.03
Total leukocyte count	10	6.0–13.9	11.8	8.4–17.4	0.00
Platelets	193	146.3–265.7	184.5	129.3–246.8	0.12
Creatinine	1.1	0.9–1.4	1.3	1.0–1.8	0.00
Serum sodium	136	133–139	137	132–141	0.36
Serum potassium	4	3.6–4.4	4.2	3.6–4.7	0.002
Serum chloride	105	101–108	104	101–109	0.87
HRCT_score	13	11–17	18	15–19.8	0.00
Total bilirubin	0.8	0.7–0.9	0.8	0.5–1.2	0.34
Conjugated bilirubin	0.4	0.3–0.5	0.3	0.2–0.5	0.002
Alkaline phosphatase	66	43.00–90.00	80	59–105	0.00
Serum glutamic oxaloacetic transaminase	45	29–65.3	50	36–72.8	0.05
Serum glutamic pyruvic transaminase	43	28–63.3	47	33–66.5	0.09
Procalcitonin	0.23	0.1–0.8	0.29	0.1–1.24	0.009
D-dimer	834	415.5–2986.5	1501.5	842.5–3342	0.00
Serum ferritin	420	214–791.3	931.9	438–1286	0.00
C-reactive protein	88.6	28.5–157.1	95.64	49–151	0.16
Lactate dehydrogenase	438	283.8–645	566	416–841	0.00
Interleukin-6	69.8	26.8–178.6	108.7	37.2–358.6	0.004

Mann–Whitney U-test applied

Table 7: Outcomes of patients infected with COVID-19

Outcomes of COVID-19 patients	Survivors (n=264)	No-survivors (n=158)	Total	P-value
Adult respiratory distress syndrome	82 (31.1)	118 (74.7)	200	<0.0001*
Respiratory failure	110 (41.7)	121 (76.6)	231	<0.0001*
Septic shock	32 (12.1)	45 (28.5)	77	<0.0001*
Cardiac failure	11 (4.2)	24 (15.2)	35	0.0001*
Acute kidney injury	18 (6.8)	44 (27.8)	62	<0.0001*
Hospitalisation days	11.8±7.1	9.8±6.2		0.003#

*Chi-square test, #t-test applied

Table 8: Risk factors associated with COVID-19 deaths

Factors	OR	95% CI of OR	P-value
Age	0.97	0.96–0.99	<0.0001
Hypertension	1.07	0.46–2.15	0.88
Non-invasive ventilator	5.10	1.62–16.06	0.005
Invasive ventilator	15.56	4.09–59.17	<0.0001
Noradrenaline	12.01	3.79–37.97	<0.0001
Renal replacement therapy	5.01	0.82–30.64	0.08
Prone position	0.89	0.29–2.75	0.84
Hydroxychloroquine	5.90	0.62–56.45	0.12
Cortico steroids	3.59	0.32–40.13	0.29
Tocilizumab	1.50	0.59–3.79	0.39
Hemoglobin	1.09	0.98–1.21	0.13
Total lymphocyte count	1.07	1.02–1.11	0.002
Serum creatinine	1.02	0.85–1.23	0.82
Serum potassium	1.45	1.00–2.10	0.046
HRCT_score	1.17	1.10–1.24	<0.0001
Conjugated bilirubin	0.94	0.66–1.35	0.75
Alkaline phosphatase	1.00	0.99–1.01	0.17
Serum glutamic oxaloacetic transaminase	1.00	0.99–1.00	0.44
Procalcitonin	1.01	0.96–1.07	0.65
D-dimer	1.00	1.00–1.00	0.58
Serum ferritin	1.00	1.00–1.00	<0.0001
Lactate dehydrogenase	1.00	0.99–1.00	0.93
Interleukin-6	1.00	1.00–1.00	0.42

Table 9: Outcome

Outcome	Number out of 422	Percentage
Death	158	37.4
Survive	264	62.6

invasive ventilation (P=0.005).[30] 171/264 (64.8%) survivors were on NIV of which many survived.

In other support systems, patients requiring vasopressors for shock (P<0.0001 for nor adrenaline) and renal replacement therapy were important factors though only vasopressors had significance in regression analysis. Severe disease, sepsis, and multi organ failure were the factors causing these supports.

Analysis of the laboratory parameters at the time of admission revealed that lymphocyte count, serum potassium, total bilirubin, serum PCT, and inflammatory markers such as serum ferritin and IL6 had significant differences (P<0.05).[31] However, in regression analysis, total lymphocyte count, high serum ferritin levels, and high HRCT scores on admission were associated with higher

Table 10: Survival analysis

Mean[a]				Median			
Estimate	Std. Error	95% confidence interval		Estimate	Std. Error	95% confidence interval	
		Lower bound	Upper bound			Lower bound	Upper bound
25.019	3.290	18.571	31.467	21.000	1.709	17.651	24.349

[a]Estimation is limited to the largest survival time if it is censored

mortality in the present study (P<0.0001).[32-34] It has been known now that COVID-19 causes considerable immune responses in the host followed by rise in inflammatory markers that inflict damage to the host systems, leading to cytokine storm and a number of other complications mentioned above. Many studies have proven these facts beyond doubts.[35]

Immediate causes of death in our patients were adult respiratory distress syndrome with respiratory failure (P<0.0001), septic shock, cardiac injury, and acute renal failure also attributed, attaining significance statistically (P<0.0001).[36,37] Complications causing death were more in non-survivors than survivors. Predominant causes of death were ARDS (74.7%) and respiratory failure (76.6%) as stated by the study of Ketcham et al.,[38] where pulmonary dysfunction was the most common cause. Total mortality was 37.4% in the present study. Similar results were also observed from studies and meta-analysis by Li Bassi et al., Armstrong et al., and Carbonella.[39-41] Which showed a mortality of 37%, 35–41%, and 30.7%, respectively. Based on the life table estimate, the cumulative survival rate within the first 8 days of follow-up was 98.1% and in the next 7 days was 96.7%. The overall median length of stay for COVID-19 patients to death was 21 days (95% CI: 17.6–24.3) in the present study and it is similar to 18.1 days by a study conducted by Marschner[42] and 15 days in the study by de Roquetaillade et al.[43] All show mortality range between 14 and 21 days.

D-dimer though raised in non-survivors did not show a significant association with in hospital mortality, but it is well known that it is increased in patients with respiratory distress and failure, and high levels are associated with mortality. Our finding may be due to discrepancy in sample size and selection of patient population.

Limitations of the study

This is a retrospective and observational study of a small sample size. The parameters were measured at the time of admission and ours being a tertiary care center delayed and severe admissions were directed to hospital that has attributed to high mortality. Furthermore, being a rural tertiary center, limitations of resources during the pandemic and lack of ideal care could have caused the comparative difference. Long-term effects of COVID-19 disease must be determined by longitudinal studies with longer follow-up periods.

CONCLUSION

Non-survivors of COVID-19 disease were older patients, mostly men with more than one co-morbid condition. Compared to survivor's higher age, ventilator support, vasopressor support, lymphocyte count, higher HRCT score, and higher ferritin levels were independent risk factors for in-hospital. Considering the limited infrastructure and paucity of resources with all the hardships faced during COVID-19 pandemic days, we could still curtail mortality at a rate fared similar to many ICUs. To reduce tragic outcomes among high-risk patients, it is advised that COVID-19 patients with these risk characteristics receive adequate hospital care rather than domiciliary management.

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