Original Article

Predictors of mortality and the need of mechanical ventilation in confirmed COVID-19 patients presenting to the emergency department in North India

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Abstract

Background and Objectives: As the number of COVID-19 cases keeps on rising, a better awareness of the nature and severity of the disease will aid in clinical decision-making and management. Hence, this study was conducted to find the predictors of mortality and the need for mechanical ventilation in COVID-19 patients. **Methods:** This was a single centre, prospective observational study conducted in a tertiary care centre in north India. We included patients with influenza like illness who tested positive for COVID-19. Information regarding patient demography, symptoms, and vital signs on presentation, laboratory values, chest imaging findings, and disease severity was collected by the emergency physician. QSOFA score and National early warning score (NEWS) score were calculated using initial vital signs. Each patient was followed up till discharge or death. **Results:** We included 116 COVID-19 patients with 33 patients having mild, 46 patients with severe and 37 patients with critical disease. The median age of our patients was 47 years (39–59) with 63% males. About 58% of patients had at least one comorbidity and shortness of breath was the most common presenting feature. The patients with severe and critical disease had a significantly higher respiratory rate and heart rate as compared to mild disease ($p < 0.05$). SpO2 of those with critical disease was significantly lower as compared to those with mild disease. Mechanical ventilation was required in around 36% of patients which included 67% of patients with critical disease. The overall mortality was 51% with 90% among critical disease. Lower SpO2 and GCS were the only parameters that showed a significant association with mortality and need for mechanical ventilation. The receiver operating characteristics analysis showed NEWS score as a better predictor of mortality and need for mechanical ventilation as compared to qSOFA score. **Conclusion:** NEWS and qSOFA scores are useful tools in predicting fatal outcomes in COVID patients with NEWS score being a better score than qSOFA.

Keywords: COVID-19, emergency department, mortality, predictors, profile

Introduction

Following the COVID-19 cases reported from Wuhan at the end of 2019, cases have been reported from all continents except Antarctica.[1] On 11 March 2020, COVID-19 was declared as a pandemic by WHO.[1] On 30 January 2020, India reported its first COVID-19 case and in National Capital Region (NCR) of India

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Received: 30-08-2020 **Revised:** 25-10-2020
Accepted: 28-10-2020 **Published:** 30-01-2021

Access this article online

Quick Response Code:

Website: www.jfmpc.com

DOI: 10.4103/jfmpc.jfmpc_1775_20

How to cite this article: Suresh S, Tiwari A, Mathew R, Bhaskararayuni J, Sahu AK, Aggarwal P, *et al*. Predictors of mortality and the need of mechanical ventilation in confirmed COVID-19 patients presenting to the emergency department in North India. J Family Med Prim Care 2021;10:542-9.

first case was reported on 2 March 2020.[2] The total number of infected people in India is nearly 34 lakhs, with NCR reporting 1,67,704 cases as of 16 August 2020.[3] Initial reports from China, Italy, and Spain suggested high mortality and overwhelmed emergency services and ICU care.[2-5]

Better understanding of COVID-19 infection in critically ill patients requiring oxygen therapy and ventilator support is important to guide decision making in the Emergency Department (ED) and prioritizing critical care and proper allocation of resources at the time of this major pandemic when EDs are over stressed due to rise in number of cases. Encouraging the use of various clinical scores may help the primary care physician in better utilization of available resources and at the same time will help them to make timely decisions regarding referral of patients who need ICU care.

The primary objective of this study was to investigate the clinico-epidemiological profile of the laboratory confirmed COVID-19 patients and find out the clinical predictors of the need of MV and mortality. Secondary objective was to compare the diagnostic accuracy of qSOFA score and NEWS score in predicting the need of MV and mortality in COVID-19 patients. Clinical endpoints of the study were the duration of hospital stay, need for mechanical ventilation (MV), duration of MV and mortality.

Methods

Study population, settings and data collection

This was a single-centre, prospective observational study carried out in the emergency department (ED) of a tertiary care centre in the north India. Duration of study was from May 1, 2020 to June 15, 2020. Patients with influenza like illness (ILI) i.e., fever with any of the upper respiratory tract infection features like cough or dyspnoea in last 14 days were screened (suspect COVID-19 case) in the designated 'COVID-19 screening area' in the ED. After initial stabilisation, these suspected cases, if fitting the admission criteria, were laboratory tested for COVID-19 (by RT-PCR for SARS-Cov-2). Admission criteria was as per the institution protocol i.e., suspected COVID-19 patients with any one of the following characteristics – age ≥60 years, presence of any comorbidity (diabetes, hypertension, cardiovascular diseases, chronic lung diseases, obesity, malignancy, immunosuppressed, chronic liver diseases, CLDs and chronic kidney diseases, CKDs), tachypnea (respiratory rate/RR ≥30/min, oxygen saturation/SpO2 ≤94%, systolic blood pressure/SBP ≤90 mmHg, altered sensorium or increased work of breathing). Relevant data were collected (described in the following paragraph) by the emergency physician who was attending the patient in a predesigned data collection form in an online database. Severity of cases was classified as: Mild disease (patients without features of severe or critical illness), severe disease (e.g. breathlessness as presenting symptoms, RR ≥30/min, SpO2 ≤94% or ≥50% lung involvement on imaging like chest radiograph or lung sonography) and critical disease (e.g. with respiratory failure, shock, need of mechanical ventilation or multiorgan dysfunction). Finally, admitted patients (in ward or intensive care unit/ICU) who were tested positive for SARS-Cov-2 were included in the study and the information were retrieved. Detailed study flow is depicted in Figure 1**.** Pregnant women, patients without ILI, laboratory confirmed patients negative for SARS-CoV-2, patients without SARS-CoV-2 reports, and patients ≤18 years of age were excluded from the study. The study was started with the waiver of permission from Institute Ethics Committee and prior to the collection of data, written consent of patient or legally acceptable relative was taken. Institute ethics committee approval was obtained (on 23-04-2020, Ref no: IEC-259/17.04.2020)

Clinical data included patient demography (age, gender), symptoms and clinical signs on presentation, point of care ultrasound findings, laboratory values, chest radiograph findings and disease severity were entered on an online data collection form by the treating emergency physician. QSOFA score (quick sequential organ failure assessment) was calculated using variables – RR ≥22/min, SBP ≤100 mmHg and Glasgow Coma Score (GCS) <15 (each of these criteria is scored one). National early warning score (NEWS) was calculated using RR, SpO2, any need of supplemental oxygen, axillary temperature, SBP, heart rate, and Alert, responds to Voice, responds to Pain, Unresponsive (AVPU) score. Each patient was followed up till discharge or death.

Results

This study comprises 116 COVID patients presented to the COVID screening area of the ED of a tertiary care centre in north India from 1 May 2020 to 15 June 2020 [Figure 1]. Out of these 116 patients, 33 patients were having mild disease, 46 patients were having severe disease and 37 patients with critical disease. The median age of our study population was 47 years (39-59) with 62.9% males. Out of these 116 patients, 68 patients (58.6%) had at least one comorbidity and hypertension was the most common comorbidity found (35%). Diabetes, CKD, malignancy, coronary artery disease, CLD, asthma, cerebrovascular accident, chronic obstructive pulmonary disease were other comorbidities present in the study population in the decreasing order of frequency [Table 1]. History of breathlessness was present in 69.8% patients making it the most common clinical feature on presentation. Cough (63.8%), fever (59.5%) were the other common symptoms. Less common features were abdominal pain, anorexia, sore throat, anosmia, and headache [Table 2].

The vital signs included in this study were those measured at the time of presentation to the ED [Table 3]. Those patients with severe and critical disease had a higher respiratory rate and pulse rate as compared to the mild disease ($p < 0.05$). SpO2 of those with critical disease was significantly lower (median SpO2 80%) as compared to those with mild disease (median SpO2 99%). Out of those patients with critical disease, 48.6% patients ($n = 18$) had a qSOFA score ≥2 on presentation which is significantly higher as compared to those with mild disease ($p < 0.001$) and the median of NEWS score was 11 (10-13) for critical disease

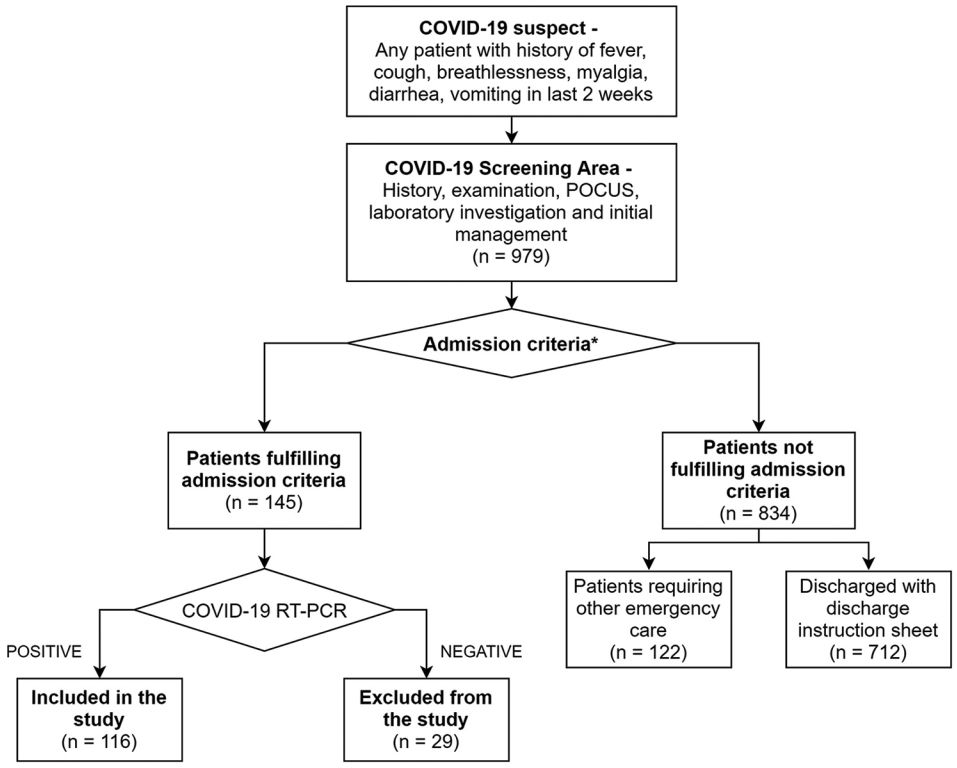


Figure 1: Diagram showing flow of included patients

Table 1: Patient demographic data and comorbidities

	Total (*n*=116)	Mild (*n*=33)	Severe (*n*=46)	Critical (*n*=37)	*P*
Age, median (IQR), years	47 (39-59)	43 (33.5-56)	47 (39-60.3)	50 (41.5-60)	0.32
Gender (%)					
Female	43 (37.1)	13 (39.4)	21 (45.7)	9 (24.3)	0.13
Male	73 (62.9)	20 (60.6)	25 (50.3)	28 (75.7)	
Comorbidity (%)					
Any	68 (58.6)	22 (66.7)	22 (47.8)	24 (64.9)	0.16
Hypertension	35 (30.2)	6 (18.2)	15 (32.6)	14 (37.8)	0.18
Diabetes	32 (27.6)	10 (30.3)	11 (23.9)	11 (29.7)	0.77
Chronic kidney disease	18 (15.5)	6 (18.2)	10 (21.7)	2 (5.4)	0.11
Malignancy	10 (8.6)	4 (12.1)	4 (8.7)	2 (5.4)	0.61
Coronary artery disease	8 (6.9)	3 (9.1)	2 (4.3)	3 (8.1)	0.67
Chronic liver disease	8 (6.9)	5 (15.2)	1 (2.2)	2 (5.4)	0.07
Asthma	5 (4.3)	1 (3)	3 (6.5)	1 (2.7)	0.64
Cerebrovascular accident	5 (4.3)	0 (0)	0 (0)	5 (13.5)	0.004
COPD	3 (2.6)	0 (0)	0 (0)	3 (8.1)	0.04

as compared to 9 (8-10) for severe disease and 2 (1-5) for mild disease ($p < 0.001$).

Mechanical ventilation was required in 36.7% patients during the course of their illness which included 20 patients (66.7%) with critical disease which was significantly higher as compared to patients (14.3%) with mild disease ($n = 4$) who required mechanical ventilation during the course of hospital stay ($p < 0.001$). The median duration of mechanical ventilation required was 7 days (2.3-10.3) for mild disease, whereas it was only 3 days (2.5-6.5) for critical disease. The median duration of hospital stay was 3 days (2.5-7) for patients with critical disease which is significantly lower compared to patients with mild disease ($p < 0.001$). The overall mortality was 51% with 90%, 40%, and 25% among the patients with critical, severe and mild disease, respectively [Table 3]

On performing the univariate logistic regression; increasing age, number of comorbidities, respiratory rate, qSOFA score and NEWS score were found to be significantly associated with mortality. Lower SpO2, GCS, presence of altered mental status and presence of critical disease were the other parameters

found to be significantly associated with mortality [Tables 4-6]. Likewise, higher respiratory rate, qSOFA score, NEWS score and lower SpO2, GCS, qSOFA, presence of critical disease, presence of altered mental status were found as significant predictors for the need of mechanical ventilation [Tables 7-9]. Although performing multivariate analysis the only variables found to have a significant association in predicting the mortality were lower SpO2 ($p = 0.003$) and lower GCS ($p < 0.02$). Similarly, lower SpO2 ($p = 0.002$) and lower GCS ($p = 0.019$) were shown to be the predictors associated with the need for mechanical ventilation.

The receiver operating characteristics (ROC) analysis showed that NEWS score (area under ROC: 0.687, 95% confidence interval, CI: 0.579-0.795) is a better predictor of need for mechanical ventilation as compared to qSOFA score (area under the curve: 0.609, 95%CI: 0.496-0.723) [Figure 2]. NEWS score of ≥10 had a sensitivity of 66.7% and a specificity of 64.5% in predicting the need for mechanical ventilation. qSOFA score of ≥2 has a sensitivity of 30.6% and specificity of 80.6% in predicting the need for mechanical ventilation. Similarly, NEWS score (area under the curve: 0.732, 95% CI: 0.633-0.830) was a better predictor of mortality than qSOFA score [Figure 3] with a sensitivity of 64% and specificity of 70.8% for a NEWS score ≥10. The sensitivity and specificity of qSOFA score ≥2 in predicting mortality were 36% and 89.6%, respectively.

Discussion

This study was carried out in a tertiary care hospital in India and has included 116 COVID patients. COVID positive patients were then categorised into mild disease (28%), severe disease (40%) and critical disease (32%) on the basis of initial vital signs and need for mechanical ventilation or inotrope support on presentation. The proportion of patients with critical disease was higher than mild disease in our study when compared to the global data where the proportion of patients with mild disease predominated.[6] This discrepancy can very well be explained by our inclusion criteria.

The median age of patients in our study was 47 years (39-59.5) with a male preponderance (73%) which is similar to another study carried out in a similar setting in India by Gupta *et al*.[6] The higher incidence of COVID 19 in males can partly be explained as male members of the society stay outdoors and travel more as compared to females for their work-related aspects and hence has higher chances of contact with others. Studies have also shown that angiotensin converting enzyme-2 which enables SARS CoV-2 binding to the cell membrane and thus enables its entry into the cells is expressed in higher concentration in males as compared to females.[7] About 60% of our study population had at least one comorbidity which is slightly higher than that found in similar other studies.[6,8] It may be because of the inclusion criteria we have followed. Hypertension and diabetes were found to be the most common comorbidities present which is in agreement with similar other studies.[6-9] Absence of comorbidity was found to have a significant negative association with the need for mechanical ventilation or mortality while at the same time, increasing number of comorbidities had a significant association with these parameters. The most common symptom was breathlessness (69.8%), followed by cough (63.8%) and fever (59.5%). Several other studies have also shown fever, cough and breathlessness as the common presenting symptoms of COVID 19.[6,8,9] but the presence of breathlessness was much lower as compared to our finding. Altered mental status was another common clinical feature present in about 13% of our patients. Atypical symptoms like abdominal pain, vomiting, diarrhoea were also present in a minority of patients. COVID-19 infection has been found to be associated with chemosensory dysfunction[10] but only 3 out of 116 patients had a history of new onset loss of smell on presentation.

The clinical characteristics like median heart rate and respiratory rate were higher in patients with critical disease as compared to mild disease and the median SpO2 decreases with the severity of the disease. Another study done by Aggarwal *et al*. in COVID patients[11] has found the similar findings. Another similar study by Jang *et al*. has shown that increasing age and presence of comorbidities were associated with critical disease in COVID patients and critical disease is more commonly associated with development of complications like acute respiratory distress syndrome and septic shock.[12] Similarly, increasing age and presence of comorbidities were also found to be associated with fatal outcomes associated with COVID in similar studies.[4,9] Whereas, our study revealed that none of these parameters had a significant role in predicting the mortality of need for mechanical ventilation in COVID patients.

There have been studies on the role of qSOFA score and NEWS score in predicting the severity and deterioration in patients with COVID.[12,13] These scores can be applied at the bedside and only include clinical parameters rather than any laboratory parameters. A recently published study by Jang *et al*. has shown NEWS score as a better tool for predicting critical outcomes in COVID patients as compared to qSOFA score.[12] The NEWS score which includes more clinical parameters as compared to qSOFA score seems cumbersome to apply but the ROC curve prepared from our data also showed similar results that NEWS score is a better predictor of need for mechanical ventilation and mortality as compared to qSOFA score. Jang *et al*. has also shown that a NEWS score > 7 is associated with a shorter survival. Our study has also shown that higher NEWS score is associated with mortality that a NEWS score ≥ 10 predicts mortality with a 64% sensitivity and 71% specificity. The low accuracy of qSOFA score in predicting mortality and need for mechanical ventilation can be due to the presence of silent hypoxemia in COVID patients who tend to breathe comfortably even at lower SPO2. qSOFA score being a simple clinical score takes into account only the respiratory rate, whereas NEWS score takes into account respiratory rate as well as SpO2.

Around 37% of our patients required mechanical ventilation which includes 66.7% of critical patients. The follow up data revealed that about 14% of patients with mild disease required mechanical ventilation during the course of their illness. The

Table 2: Presenting clinical features

	Total (*n*=116)	Mild (*n*=33)	Severe (*n*=46)	Critical (*n*=37)	*P*
Presenting clinical features (%)					
Breathlessness	81 (69.8)	11 (33.3)	42 (91.3)	28 (75.7)	<0.001
Cough	74 (63.8)	18 (54.5)	40 (87)	16 (43.2)	<0.001
Fever	69 (59.5)	18 (54.4)	30 (65.2)	21 (56.8)	0.58
Muscle or joint pain	19 (16.4)	4 (12.1)	11 (23.9)	4 (10.8)	0.2
Altered mental status	15 (12.9)	5 (15.2)	2 (4.3)	8 (21.6)	0.06
Expectoration	15 (12.9)	1 (3)	10 (21.7)	4 (10.8)	0.04
Recurrent vomiting	13 (11.2)	6 (18.2)	1 (2.2)	6 (16.2)	0.04
Diarrhea	10 (8.6)	3 (9.1)	3 (6.5)	4 (10.8)	0.78
Chest pain	9 (7.8)	1 (3)	5 (10.9)	3 (8.1)	0.44
Abdominal pain	6 (5.2)	4 (12.1)	0 (0)	2 (5.4)	0.06
Anorexia	6 (5.2)	0 (0)	6 (13)	0 (0)	0.008
Sore throat	4 (3.4)	1 (3)	2 (4.3)	1 (2.7)	0.91
New onset loss of smell	3 (2.6)	2 (6.1)	1 (2.2)	0 (0)	0.27

Table 3: Hemodynamic parameters on presentation and outcome of patients

	Total (*n*=116)	Mild (*n*=33)	Severe (*n*=46)	Critical (*n*=37)	*P*
Hemodynamic parameters on presentation, median (IQR)					
Respiratory rate, per min	28 (21-33)	20 (15-22)	30 (26-36)	30 (25-40)	<0.001
Oxygen saturation, %	88 (71-97.8)	99 (97.5-99)	85 (70-89.3)	80 (55-88)	<0.001
Pulse rate, per min	110 (88-120)	98 (88-112)	103 (88-117)	112 (110-130)	0.002
Systolic blood pressure, mmHg	122 (110-140)	120 (110-127)	135 (119-150)	120 (90-140)	0.005
Glasgow coma score	15 (15-15)	15 (15-15)	15 (15-15)	15 (10-15)	<0.001
qSOFA score	1 (1-1)	1 (0-1)	1 (1-1)	1 (1-2)	<0.001
qSOFA (%)					
Score <2	89 (76.7)	30 (90.9)	40 (87)	19 (51.4)	<0.001
Score ≥2	27 (23.3)	3 (9.1)	6 (13)	18 (48.6)	
NEWS score	9 (4-10)	2 (1-5)	9 (8-10)	11 (10-13)	<0.001
Outcomes (%)					
Mechanical ventilation (MV)	36 (36.7)	4 (14.3)	12 (30)	20 (66.7)	<0.001
Duration of MV, days	3 (1-7)	7 (2.3-10.3)	2 (1-6.5)	3 (2.5-6.5)	0.31
Hospital length of stay, days	4 (1.5-7.5)	9.5 (6.5-17.75)	2 (1-6.5)	3 (2.5-7)	0.001
Mortality	50 (51)	7 (25)	16 (40)	27 (90)	<0.001

Table 4: Predictors of mortality among demographic profile and comorbidities

Characteristics	Predictors of Mortality			
	Univariable OR (95% CI)	*P*	Multivariable OR (95% CI)	*P*
Age	1.044 (1.014-1.075)	0.004	1.033 (0.995-1.072)	0.091
Gender	0.979 (0.432-2.216)	0.959		
Comorbidity				
Number of comorbidities	1.539 (1.019-2.325)	0.041	1.659 (0.879-3.129)	0.118
Hypertension	1.442 (0.583-3.563)	0.428		
Diabetes	1.412 (0.584-3.414)	0.444		
Chronic kidney disease	1.116 (0.371-3.358)	0.846		
Malignancy	0.748 (0.188-2.969)	0.68		
Coronary artery disease	3.136 (0.601-16.38)	0.175		
Chronic liver disease	5.222 (0.587-6.756)	0.138		
Asthma	0.958 (0.130-7.090)	0.967		
Cerebrovascular accident	1.010 (0.999-1.120)	0.999		
COPD	1.078 (0.897-1.124)	0.999		

median duration of hospital stay was found to decrease with the severity of the disease. This is due to the higher mortality rates in critical patients (90%) as compared to mild disease (25%) which has led to shorter hospital stay. Most estimates of fatality rates of COVID have been based on cases detected through surveillance and calculated using crude methods and WHO has given a widely

Table 5: Predictors of mortality among presenting clinical features

Characteristics	Predictors of Mortality			
	Univariable OR (95% CI)	*P*	Multivariable OR (95% CI)	*P*
Presenting clinical features				
Breathlessness	0.875 (0.370-2.069)	0.761		
Cough	0.618 (0.266-1.432)	0.262		
Fever	0.534 (0.234-1.218)	0.136		
Duration of fever	1.068 (0.958-1.191)	0.234		
Muscle or joint pain	1.286 (0.437-3.780)	0.648		
Altered mental status	4.231 (1.100-16.27)	0.036	0.584 (0.063-5.409)	0.635
Expectoration	0.377 (0.108-1.319)	0.127		
Recurrent vomiting	1.791 (0.489-6.560)	0.379		
Diarrhea	0.549 (0.124-2.435)	0.43		
Chest pain	0.549 (0.124-2.435)	0.43		
Abdominal pain	1.468 (0.234-9.196)	0.682		
Anorexia	0.176 (0.020-1.562)	0.119		
Sore throat	0.959 (0.058-15.78)	0.977		
New onset loss of smell	0.959 (0.058-15.78)	0.977		

Table 6: Predictors of mortality among hemodynamic parameters and disease severity

Characteristics	Predictors of mortality			
	Univariable OR (95% CI)	*P*	Multivariable OR (95% CI)	*P*
Hemodynamic parameters on presentation, median (IQR)				
Respiratory rate	1.052 (1.006-1.101)	0.027	0.997 (0.912-1.090)	0.945
Oxygen saturation	0.939 (0.909-0.971)	<0.001	0.922 (0.875-0.973)	0.003
Pulse rate	1.015 (0.992-1.038)	0.204	0.994 (0.959-1.030)	0.738
Systolic blood pressure	0.994 (0.978-1.010)	0.45	0.978 (0.953-1.003)	0.083
Glasgow coma score	0.492 (0.265-0.913)	0.025	0.451 (0.229-0.888)	0.021
qSOFA score	3.682 (1.720-7.882)	0.001	-	-
NEWS score	1.253 (1.111-1.414)	<0.001	-	-
Disease severity (reference - mild)				
Severe	2.000 (0.690-5.795)	0.202		
Critical	27.00 (6.222-65.74)	<0.001		
Need of mechanical ventilation	109.7 (13.82-869.9)	<0.001		

Table 7: Predictors of need for mechanical ventilation among demographic profile and comorbidities

Characteristics	Predictors of need of mechanical ventilation			
	Univariable OR (95% CI)	*P*	Multivariable OR (95% CI)	*P*
Age	1.022 (0.995-1.050)	0.118		
Gender	1.117 (0.477-2.616)	0.798		
Comorbidity				
Number of comorbidities	1.245 (0.831-1.866)	0.288		
Hypertension	1.379 (0.551-3.449)	0.492		
Diabetes	0.940 (0.378-2.341)	0.895		
Chronic kidney disease	1.178 (0.382-3.631)	0.776		
Malignancy	0.462 (0.091-2.356)	0.353		
Coronary artery disease	1.812 (0.424-7.739)	0.422		
Chronic liver disease	1.788 (0.341-9.366)	0.492		
Asthma	0.562 (0.056-5.613)	0.624		
Cerebrovascular accident	1.102 (0.955-1.134)	0.999		
COPD	3.588 (0.314-41.04)	0.304		

variable case fatality rate by country which ranges from <0.1% to over 25%.[14] Our data have shown an overall mortality rate of 51% among COVID patients with 90% mortality among those with critical disease. This rate is alarmingly high as compared to the national data which shows a mortality rate of 2.04%[15] and this can be explained by our study population which included a

Table 8: Predictors of need for mechanical ventilation among presenting clinical features

Characteristics	Predictors of need of mechanical ventilation			
	Univariable OR (95% CI)	*P*	Multivariable OR (95% CI)	*P*
Presenting clinical features				
Breathlessness	1.496 (0.621-3.606)	0.369		
Duration of breathlessness	0.959 (0.816-1.127)	0.611		
Cough	1.336 (0.568-3.145)	0.507		
Fever	1.444 (0.613-3.404)	0.4		
Duration of fever	1.011 (0.917-1.114)	0.829		
Muscle or joint pain	1.337 (0.424-4.213)	0.62		
Altered mental status	2.667 (0.843-8.435)	0.095	1.249 (0.162-9.606)	0.831
Expectoration	2.115 (0.542-8.258)	0.281		
Recurrent vomiting	2.280 (0.643-8.090)	0.202		
Diarrhea	0.965 (0.217-4.299)	0.963		
Chest pain	0.224 (0.026-1.904)	0.171		
Abdominal pain	1.157 (0.184-7.272)	0.877		
Anorexia	1.115 (0.952-1.515)	0.999		
Sore throat	0.574 (0.035-9.462)	0.698		
New onset loss of smell	0.998 (0.959-1.015)	0.999		

Table 9: Predictors of need for mechanical ventilation among hemodynamic parameters and disease severity

Characteristics	Predictors of need of mechanical ventilation			
	Univariable OR (95% CI)	*P*	Multivariable OR (95% CI)	*P*
Hemodynamic parameters on presentation, median (IQR)				
Respiratory rate	1.059 (1.011-1.109)	0.016	1.006 (0.926-1.094)	0.88
Oxygen saturation	0.954 (0.929-0.980)	0.001	0.922 (0.876-0.971)	0.002
Pulse rate	1.012 (0.989-1.036)	0.312	0.985 (0.953-1.019)	0.396
Systolic blood pressure	1.002 (0.986-1.019)	0.807	0.983 (0.959-1.006)	0.149
Glasgow coma score	0.677 (0.520-0.882)	0.004	0.467 (0.247-0.883)	0.019
qSOFA score	1.962 (1.038-3.708)	0.038	-	-
NEWS score	1.198 (1.060-1.353)	0.004	-	-
Disease severity (reference - mild)				
Severe	2.571 (0.732-9.030)	0.141		
Critical	12.00 (3.262-44.14)	<0.001		

higher proportion of severe (40%) and critical (32%) patients. Yang *et al.* has shown that the mortality among critically ill COVID patients is significantly high and reaches above 80%[4] which in fact is in agreement with our data.

Conclusion

We have found that lower SpO2 and lower GCS are the clinical parameters that have a significant association in predicting the need for mechanical ventilation and mortality. Similarly, NEWS score and qSOFA score are useful bedside scores in predicting the prognosis of COVID patients with NEWS score being more accurate in predicting mortality and need for mechanical ventilation. Hence, these scores can be used at initial evaluation of patients and necessary management decisions can be taken immediately as there is no definitive antiviral therapy available as of now.

Limitations

The study population is not a true representation of the COVID patients as it was a convenient sample at a single centre and the sample size is limited to only 116 patients. Our study has included a comparatively higher proportion of patients with critical disease as it is evident from our inclusion criteria.

Declaration of patient consent

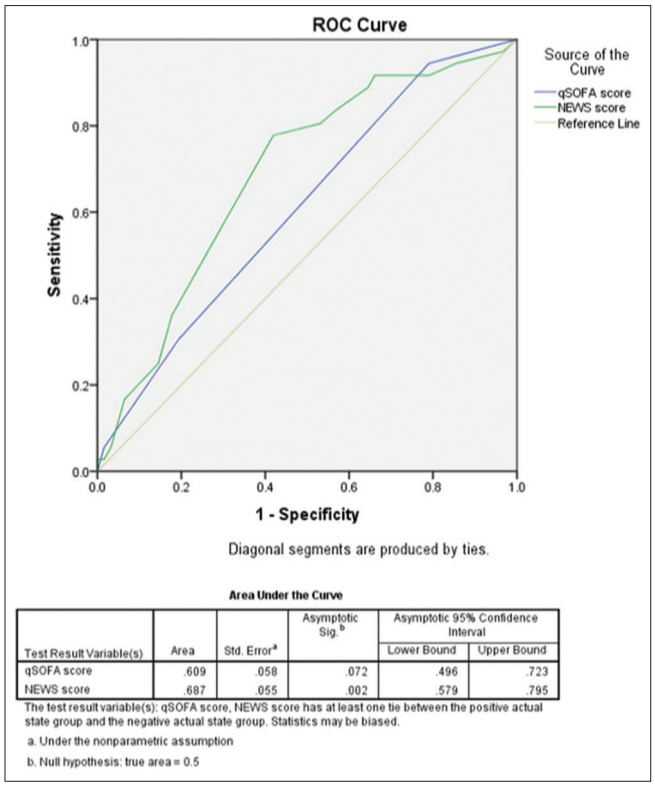
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.



Area Under the Curve

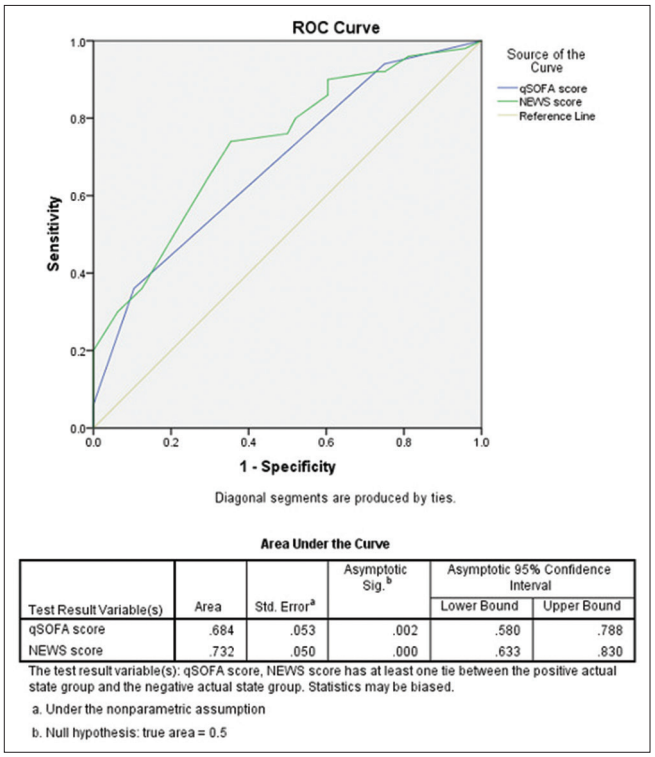
Test Result Variable(s)	Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
qSOFA score	.609	.058	.072	.496	.723
NEWS score	.687	.055	.002	.579	.795

The test result variable(s): qSOFA score, NEWS score has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5

Figure 2: ROC curve showing comparison between NEWS score and qSOFA score in predicting need for mechanical ventilation



Area Under the Curve

Test Result Variable(s)	Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
qSOFA score	.684	.053	.002	.580	.788
NEWS score	.732	.050	.000	.633	.830

The test result variable(s): qSOFA score, NEWS score has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5

Figure 3: ROC curve showing comparison between NEWS score and qSOFA score in predicting mortality

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