

A STUDY OF CLINICAL PROFILE OF COVID-19 IN A TERTIARY HEALTH CARE CENTRE

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ABSTRACT

Background: SARS-CoV-2 virus rapidly spread from Wuhan to rest of the world leading to a global pandemic. COVID-19 can have diverse range of clinical presentations. In our study we review the clinical profile, laboratory parameters, comorbidities, duration of hospital stay, treatment and fatality of COVID-19 patients. **Methodology:** A total of 1754 patients with confirmed COVID-19 infection were admitted at a rural tertiary care centre, Karnataka, India. It is a prospective observational study done for a period of six months from July 2020 to December 2020. Clinical data including demographic data, symptomatology, comorbidities, laboratory parameters, treatment and complications were recorded. **Results:** Out of 1754 COVID-19 patients, males were affected more than females. Most of them were middle-aged (40.5%). 69.6% had pulmonary manifestations. 20.5% had extra pulmonary manifestations in the form of neurological, gastrointestinal, cardiovascular, cutaneous symptoms. 60.9% patients had pre-existing comorbidities. Overall fatality was 4.27%. **Conclusion:** In our study we concluded that COVID-19 can have both pulmonary and extra-pulmonary manifestations and fatality correlated with the severity of COVID-19 infection.

KEYWORDS: COVID-19, Pulmonary, Extrapulmonary, inflammatory markers, ARDS.**INTRODUCTION**

In late December 2019, an outbreak of a mysterious pneumonia characterized by fever, dry cough, fatigue, and occasional gastrointestinal symptoms occurred in a seafood wholesale wet market, in Wuhan, Hubei, China. On December 31st 2019, China notified the outbreak to the World Health Organization, the virus was identified as a coronavirus that had more than 95% homology with the bat coronavirus and more than 70% similarity with the SARS-CoV. This new coronavirus is now called the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that causes COVID-19, one of several known to infect humans. Scientists claim, that this virus is probably been around for some time in animals crossing over into humans. Hence, this virus is not new to the world, but it is new to humans. It rapidly spread from its origin in Wuhan City of Hubei Province of China to the rest of the world. On 11th March 2020, WHO declared COVID-19 a global pandemic. India, still continues to be in the grip of the pandemic and, in terms of absolute numbers, the 2nd worst affected country after USA. Our study aims to review the clinical profile, encompassing the clinical symptoms and signs, laboratory parameters, course of hospital stay and treatment of COVID-19 patients.

MATERIALS AND METHODS

This is a prospective observational study done for a period of six months from the month of July to December 2020 at a rural tertiary health care centre Karnataka, India. The confirmed diagnosis of COVID-19 was defined as a positive result by using real-time Rt-PCR detection on nasopharyngeal swab. Clinical data including demographic data, symptomatology, comorbidities, laboratory parameters, treatment and complications were recorded.

RESULTS

A total of 1754 COVID-19 patients were admitted during a period of six months. Most common age group involved was 40-60 years of age (40.5%), followed by more than 60 years of age (37.3%) and less than 40 years of age (22.1%). [TABLE 1].

Table 1: Age Distribution in covid-19 cases.

Age Distribution	N=1754
<40 YEARS	388
40-60 YEARS	711
>60 YEARS	655
TOTAL	1754

Males were more commonly affected than females, with male-to-female ratio of 1.2:1. [TABLE 2]

Table 2: Sex Distribution in covid-19 cases.

Sex Distribution	N=1754
MALES	958
FEMALES	796
TOTAL	1754

65.6% COVID-19 patients hailed from rural areas, whereas 34.9% patients hailed from urban areas. History of travel and contact was seen in 32.3% and 41.7% respectively.

1754 COVID-19 patients on admission were categorized as mild, i.e., Patients with uncomplicated upper respiratory tract infection, may have mild symptoms such as fever, cough, sore throat, nasal congestion,

malaise with no evidence of hypoxemia or breathlessness; moderate i.e., Pneumonia with no signs of severe disease, adults with presence of clinical features of dyspnea and/or hypoxia, fever, cough, including SpO₂ of 90 to ≤93% on room air, respiratory rate more or equal to 24 per minute; severe pneumonia i.e., adults with clinical signs of pneumonia plus one of the following; respiratory rate >30 breaths/min, severe respiratory distress, SpO₂ <90% on room air, ARDS, sepsis and septic shock, according to the MOHFW 03/06/2020 guidelines. [TABLE 3]

Table 3: Categorization of covid-19.

Category of Covid-19	N=1754
MILD (SpO ₂ > 95%)	430
MODERATE (SpO ₂ 90-94%)	775
SEVERE (SpO ₂ < 90%)	549
TOTAL	1754

Among 1754 COVID-19 patients, 1582 patients were symptomatic and 172 patients were asymptomatic. [CHART 1] Among symptomatic patients, 1222 had pulmonary manifestations, 360 had extra pulmonary manifestations.

COVID-19 STATISTICS AT A RURAL TERTIARY HEALTH CARE CENTRE

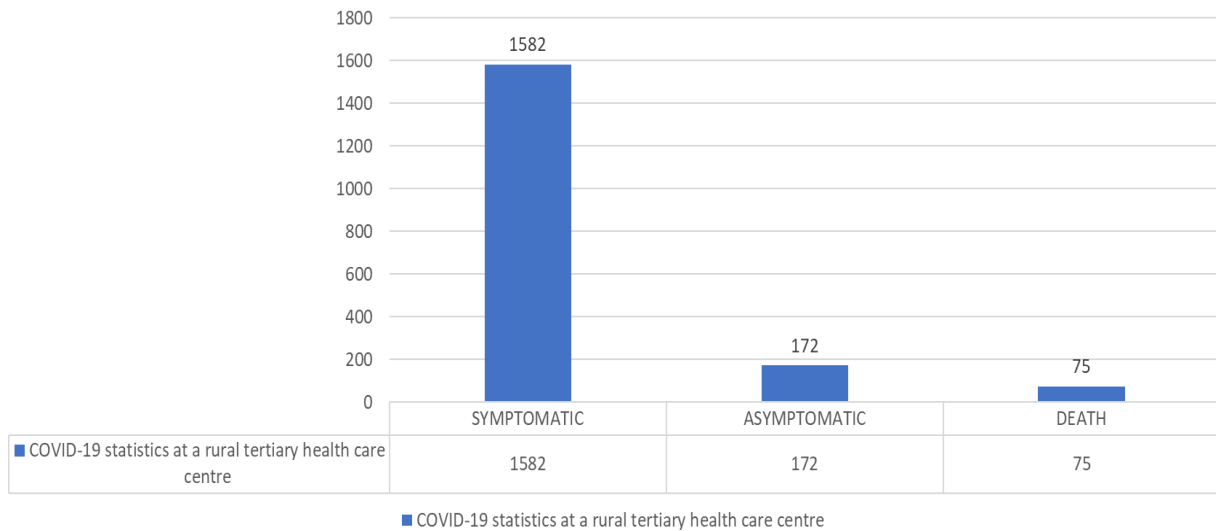


Chart 1: Covid-19 Statistics at a rural tertiary health care centre.

Clinical symptoms of COVID-19 patients were classified as pulmonary and extra pulmonary symptoms. [TABLE 4 & 5]

Pulmonary manifestations of COVID-19 included variety of respiratory symptoms like fever, cough, sore throat, rhinorrhea, breathlessness and general symptoms like myalgia, arthralgia, fatigue etc. Extra pulmonary manifestations seen were predominantly neurological symptoms, followed by gastrointestinal, cardiovascular and cutaneous manifestations. “Happy Hypoxia” was seen in 123 of 549 severe COVID-19 patients.

Table 4: Clinical Symptoms of covid-19.

CLINICAL SYMPTOMS		N=1754
Respiratory symptoms	Fever	825
	Cough	1019
	Rhinorrhea	566
	Sore throat	485
	Breathlessness	780
General symptoms	Myalgia	492
	Arthralgia	294
	Fatigue	602
Neurological symptoms	Headache	108
	Anosmia	53
	loss of taste	31
	CVA	12
	Altered sensorium	8
	Seizures	7
Gastrointestinal symptoms	Loose stools	46
	Pain abdomen	33
	Anorexia	18
	Nausea	17
	Vomiting	36
Cardiovascular symptoms	Chest pain	5
	Palpitations	2
	Giddiness	32
	Syncope	36
Cutaneous symptoms	Rash	3
	Petechiae	2
	Acral papules	1

Table 5: Vital Parameters.

Vital Parameters		Mild (430)	Moderate(775)	Severe (549)
Pulse	Tachycardia>100bpm	218	306	405
	Bradycardia<60bpm	30	65	49
Blood pressure	HypertensionBP>140/90mmhg	26	85	92
	HypotensionBP<100/60mmhg	4	9	12
Temperature	Temperature>100F	194	270	361

Among 1754 COVID-19 patients, 1069 patients had preexisting comorbidities (60.9%) and 685 patients had no comorbidities (39%). Out of 1069 patients of COVID-19 with comorbidities, 378 were classified as mild, 408 and 283 as moderate and severe COVID-19 respectively at the time of admission. Out of 685 COVID-19 patients without comorbidities, 394 patients were classified as mild, 205 patients as moderate and 86 patients as severe COVID-19.

406 COVID-19 patients had Diabetes Mellitus as pre-existing comorbid condition, 387 patients had Systemic Hypertension, 188 patients had both Diabetes & Hypertension, 123 patients had COPD, 48 patients had bronchial asthma, 64 patients had chronic liver disease, 47 patients had chronic kidney disease, 111 patients had obesity, 38 patients had CVA, 83 patients had CAD, 29 patients had hypothyroidism and 11 patients had malignancy. [CHART 2].

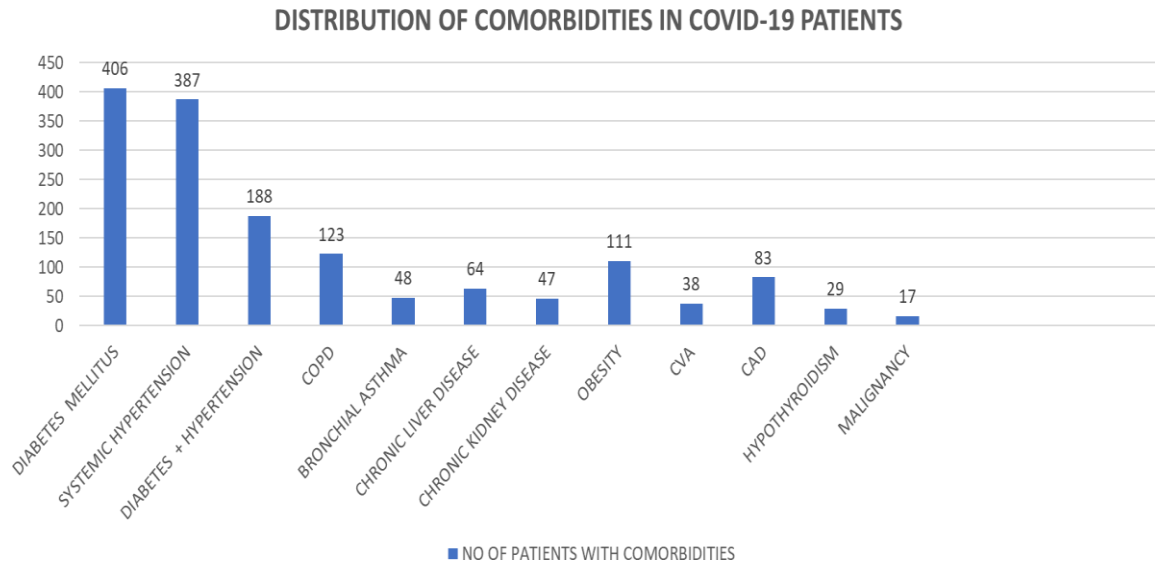


Chart 2: Distribution of comorbidities in covid-19.

Laboratory parameters like increased NLR, thrombocytopenia, altered LFT & RFT and elevated inflammatory markers were found in majority of patients,

significantly higher in patients of severe COVID-19. [TABLE 6 & 7]

Table 6: Laboratory Parameters in covid-19.

Laboratory parameters	Mild	Moderate	Severe
Increased NLR	215	676	533
Thrombocytopenia	14	78	194
Altered LFT	107	299	907
Altered RFT	16	192	487

Table 7: Inflammatory Markers in covid-19.

Raised inflammatory markers	Mild	Moderate	Severe
ESR	86	602	501
CRP	74	446	520
SERUM FERRITIN	88	389	475
SERUM LDH	59	336	487
D-DIMER	96	529	536

Chest x-ray was done in all symptomatic patients, 1246 patients had typical bilateral peripheral opacities on chest x-ray. HRCT chest was done in 800 patients of COVID-19 and reported as CORADS 6 with variable CT severity scores.

Mean duration of hospital stay was 7-14 days. Patients of severe category COVID-19 had prolonged duration of hospital stay. During the course of hospital stay, 73 mild category patients had progressed to moderate category and over 40 moderate category patients progressed to severe category.

1005 COVID-19 patients required oxygen supplementation either regular or high flow oxygen. 132 patients required noninvasive ventilation and 77 patients required invasive ventilation in the form of mechanical ventilation.

Out of 1754, there was 75 deaths, with a case fatality rate of 4.27%. 72 of 75 patients were categorized as severe

and 3 belonged to moderate category. Most common cause of death was ARDS in 53 patients followed by sepsis, septic shock and MODS in 22 patients.

DISCUSSION

SARS-CoV-2 has made its way across the globe to affect over 180 countries infecting humans of all age groups, of all ethnicities, both males and females while spreading through communities at an alarming rate.^[1] Most common age group involved in our study was 40-60 years of age, this is in line with a study done by Bhargava et al where 80.9% patients were below 60 years of age.^[2] COVID-19 shows an increased number of cases and a greater risk of severe disease with increasing age a feature shared with the 2003 SARS epidemics. Understanding the role of age in transmission and disease severity is critical for determining the likely impact of social-distancing interventions on SARS-CoV-2 transmission, especially those aimed at schools, and for estimating the expected global disease burden.^[3,4]

Our study showed male preponderance (54.5%) similar to a study reported by Bhandari et al and Wang et al which showed (66.6%) and (54.3%) male preponderance respectively.^[2,5] This male predominance may be due to increased foreign travel by males for occupational purposes.

In our study, majority (44.18%) of them were categorized as moderate COVID-19 at admission and 31.2% were categorized as severe COVID-19 in contrast to a study done by Zhang et al. where prevalence of severe COVID-19 was 17.84%.^[5,18]

In our study, cough was the most common symptom (83.06%) followed by fever (67.59%) which was in contrast to that reported by Huang et al and Wang et al, where fever was the most common symptom.^[5]

COVID-19 exhibits a diverse range of clinical presentations. In our study, 172 patients were asymptomatic at admission, and remained so throughout the hospital course. This may be a cause of concern as these asymptomatic patients are potential carriers or transmitters of infection in the community.^[6]

Among symptomatic patients, 1222 patients had pulmonary manifestations and 360 patients had extra pulmonary manifestations such as neurological presentations (headache, anosmia, dysgeusia, CVA, altered sensorium, seizures), gastrointestinal presentations (diarrhea, vomiting, abdominal pain), cardiovascular presentations (myocardial infarction, arrhythmias), and cutaneous presentations (maculopapular rash, petechiae, painful red purple papules).

SARS-CoV-2 virus primarily affects the respiratory system, although other organ systems are also involved. It is now widely recognized that respiratory symptoms of COVID-19 are extremely heterogeneous, ranging from minimal symptoms to significant hypoxia with ARDS. It is reported that a proportion of COVID-19 patients presented with silent hypoxemia or happy hypoxia. These patients do not present with overt clinical symptoms even with a SpO₂ of 70 or lower.^[7] Similarly in our study, 123 patients presented with a SpO₂ of less than 75% with no overt breathlessness. In a recent study, the time between the onset of symptoms and the development of ARDS was as short as 9 days, suggesting that the respiratory symptoms could progress rapidly.^[8,9]

People with underlying uncontrolled medical conditions such as diabetes; hypertension; lung, liver, and kidney disease; cancer patients on chemotherapy; smokers; transplant recipients; and patients taking steroids chronically are at increased risk of COVID-19 infection.^[10] The most common comorbidities identified in our study was diabetes mellitus (37.9%), followed by systemic hypertension (36.2%). which is in contrast to a study done by Sanyaolu et al. where hypertension was the most common comorbidity (15.8%) associated with

COVID-19.^[11]

Single-center studies suggest that numerous inflammatory markers are elevated in patients in the intensive care unit or patients with severe disease relative to patients with milder conditions. Liu Y et al. in Zhongnan Hospital of Wuhan University identified an elevation in the neutrophil-to-lymphocyte ratio as an independent and significant predictor of mortality among 245 hospitalized COVID-19 patients, with an 8% increase in mortality with each unit increase neutrophil-to-lymphocyte ratio.^[12]

A recent study reported 83.3% patients belonging to the severe category had elevated CRP, LDH, ferritin and D-dimer.^[13,14] Similarly in our study, 98% COVID-19 patients belonging to severe category had elevated inflammatory markers. According to Zhou et al., D-dimer levels exceeding 1.0 µg/mL at hospital admission correlated significantly with death among hospitalized COVID-19 patients in China, with a p-value of less than 0.001.^[15] Contributory mechanisms include systemic pro-inflammatory cytokine responses that are mediators of atherosclerosis directly contributing to plaque rupture through local inflammation, induction of procoagulant factors, and hemodynamic changes, which predispose to ischemia and thrombosis.

In our study, Chest x-ray was done in all symptomatic patients, HRCT chest was done in 800 patients. 1246 patients had abnormal chest x-ray findings, of which peripheral ground glass opacities affecting the lower lobes was predominantly seen. CT Chest was done in 800 patients, reported as CORADS 6 with variable CT severity scores. Our findings are in consensus with previous studies on chest x-ray and CT chest scans.^[16]

In our study, 75 COVID-19 patients (4.27%) succumbed in contrast to a study done by Zhou et al. where 54 of 191 (28%) patients succumbed.

ARDS was the leading cause of mortality seen in 53 of 75 COVID-19 patients. COVID-19 ARDS appears to have worse outcomes than ARDS from other causes. Wu et al. in his study reported that mortality in COVID-19 ARDS ranged between 26% and 61.5% if ever admitted into a critical care setting, and in patients who received mechanical ventilation, the mortality ranged between 65.7% to 94%. The high mortality rate in COVID-19 associated ARDS necessitates a prompt and aggressive treatment strategy. It has long been our understanding that inflammation is the key factor that drives the pathophysiology of ARDS, irrespective of the etiology.^[9,17,18]

CONCLUSION

COVID-19 predominantly affected the middle-aged males in our study. Both pulmonary and extrapulmonary manifestations were seen along with altered laboratory

parameters, raised inflammatory markers correlating with the severity of infection and fatality was more in patients with comorbidities and severe COVID-19.

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