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Demographics, Clinical features and Outcome of COVID-19 patients admitted to tertiary care hospital

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Background: In December 2019, a novel coronavirus (SARS-CoV-2) emerged in China and rapidly spread globally including India and has presented major challenges to health care from initial diagnosis to patient monitoring and treatment. Various studies in different countries have reported variations in demographics, clinical observations and outcomes of Novel Coronavirus disease 2019 (COVID-19) therefore, it is important to analyze and document these in local population. **Objectives:** Present study was aimed to describe clinical and demographic characteristics and outcomes of COVID-19 patients. **Materials and methods:** This retrospective study was conducted for a period of six months from September 2020 to February 2021 at Microbiology Department, Molecular laboratory Basaveshwara medical college and hospital (BMCH), Chitradurga. All clinically suspected RTPCR positive COVID-19 patients admitted to COVID Care Centre, BMCH were included in study. **Results:** A total of 1368 RTPCR positive COVID-19 patient's data were analysed. Mean age of all patients was 38.9 years (± 12.5 SD). Males (59.3%) were slightly higher in number than females (40.6%). Co-morbidities associated with COVID-19 patients were, Hypertension 268(19.5%), diabetes 238 (17.3%), COPD 84(6.1%), chronic kidney disease 34 (2.4%) and chronic liver disease in 19 (1.3%) patients. Of 1368 COVID-19 patients, 723(52.9%) were asymptomatic, 645(47.2%) symptomatic, 289 (21.1%) patients had intensive care unit (ICU) admission, 1084(79.2%) discharged after recovery from COVID-19 and 191(13.6%) cases had mortality. **Conclusion:** Observations from our study suggests that asymptomatic COVID-19 patients have better outcomes than symptomatic patients, and patients with more than one comorbidities were more vulnerable to disease severity and critical condition.

Keywords: Coronavirus disease 2019(COVID-19), Comorbidities, Symptomatic and Asymptomatic patients, Mortality

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Introduction

The pandemic of Novel Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus -2 (SARS-CoV-2) has become a real challenge to mankind and the medical community and has raised several medical and social issues.[1] Older age, smoking and underlying non-communicable diseases such as diabetes, hypertension, cardiac disease, chronic lung and kidney disease have been reported as risk factors for severe COVID-19 disease and death.[2] Epidemiological and virological studies suggest that transmission of SARS-CoV-2 mainly occurs from both symptomatic and asymptomatic people to others by close contact through respiratory droplets or by direct contact with infected persons, or by contact with contaminated objects and surfaces or by aerosols.[2]

Most patients infected with SARS-CoV-2 are asymptomatic or present with an uncomplicated mild illness characterized by fever, dry cough, myalgia, nausea, asthenia, and diarrhoea. Up to 14% of patients, however, can evolve toward the development of a severe respiratory disease, characterized by interstitial pneumonia and progressively worsening respiratory impairment requiring ventilatory assistance. About 5% of patients ultimately develop a full-on severe acute respiratory distress syndrome (SARS), requiring an intensive care unit (ICU) admission. These patients are also at risk of developing sepsis, septic shock, metabolic acidosis, coagulopathy, and multiorgan failures, such as liver, kidneys, and heart.[3]

Clinical status, in particular peripheral oxygen saturation (SpO2) levels, and concurrent comorbidities of COVID-19 patients largely determine the need for their admittance to ICUs, laboratory diagnosis can be of great help in the definitive diagnosis.[4,6] The decision to test for SARS-CoV-2 infection should be based on both clinical and epidemiological factors [4].

The demographic characteristics, comorbid conditions association, presentation of clinical features, and outcomes of patients with COVID-19 have been reported variable in different countries in various studies therefore, it is important to analyze and document these in the local population.[4,5,6] This study aims to describe the demographics, clinical characteristics and outcomes among COVID-19 patients.

Materials and Methods

Setting: The study was conducted at Microbiology department, Basaveshwara Medical College and Hospital, Chitradurga district, Karnataka.

Duration and type of study: A retrospective study was conducted for a period of six months from September 2020 to February 2021.

Sampling methods: All continuous samples which satisfy inclusion criteria were taken for study.

Inclusion criteria: All clinically suspected patients tested positive for COVID-19 by RT PCR.

Exclusion criteria: Insufficient reported data information of COVID-19 patients excluded from the study.

Data collection procedure: Nasal and oropharyngeal swabs (of clinically suspected COVID-19 patients) sent in viral transport media (VTM) in cold chain to the Department of Microbiology, Molecular laboratory BMCH Chitradurga was immediately tested for COVID-19 RT-PCR qualitative assay on Quant-studio Real-time thermocycler system. The CT (cycle threshold cut-off) value and amplification curve were observed and the result was expressed as positive or negative. All required details of RTPCR positive COVID-19 patients admitted in COVID care Centre i.e –Demographic characters, comorbid conditions, clinical features, laboratory tests, radiological reports, treatment and outcome data were extracted from the hospital medical records section and analyzed.

After reviewing the guidelines of various international societies and revised national clinical management guidelines for COVID-19 by the Ministry of Health and Family Welfare (MOHFW), Government of India, 13 June 2020 [8] a standard protocol was devised which included case definitions for SARS-CoV-2 infection Categorization, baseline and follow up investigations and treatment plan according to clinical severity by a group of experts from various specialties of BMCH Chitradurga.

Study groups: Based on the burden of comorbid illness, clinical, laboratory and radiological characters COVID-19 patients were grouped as asymptomatic and symptomatic patients and evaluated.

Asymptomatic cases- patients without positive CT findings (or with positive CT findings but no symptoms).

The severity of symptomatic COVID-19 was assessed as per the MOHFW guidelines, Government of India [8] as mild, moderate and severe cases.

01. **Mild cases** were those COVID-19 patients who had uncomplicated upper respiratory tract infection with no evidence of hypoxia and breathlessness
02. **Moderate cases** were those with radiological and clinical features of pneumonia with SpO2 in the range of 90%–94%, with a respiratory rate of more or equal to 24 breaths per minute
03. **Severe cases** were those who were meeting any of the following criteria: respiratory distress with respiratory rate ≥30/min and oxygen saturation ≤90% at rest or respiratory rate ≥24 breaths per minute along with features of sepsis and septic shock.

Ethical consideration & permission: Ethical clearance for this study was obtained from the institutional ethical clearance committee.

Statistical Analysis: Categorical variables were represented as frequency and percentage, and continuous variables were seen as the median and interquartile range (IQR) using Microsoft Excel and Statistical Package for the Social Sciences (SPSS).

Results

Data from 1368 RTPCR positive COVID-19 patients admitted to COVID care Centre BMCH were analyzed in our study retrospectively.

Clinical and demographic characteristics (Table 1): The mean age of all patients was 38.9 years (± 12.5 SD). 679(49.6%) patients were between 18-45years, 481 (35.1%) were between 46-60 years and 208(15.2%) were aged above 60 years. Males (59.3%) were higher than females (40.6%). No comorbidities were observed in 1004(73.3%) patients. Co-morbidities of the patients observed are Hypertension in 268(19.5%), diabetes in238 (17.3%), COPD in 84(6.1%), chronic kidney disease in 34 (2.4%) and chronic liver disease in 19 (1.3%) patients. Of the 1368 COVID-19 patients, 723(52.9%) were asymptomatic,645(47.2%) were symptomatic , 289 (21.1%) patients had intensive care unit (ICU)admission,1084(79.2%) cured from COVID-19 and discharged and 191(13.6%) cases had mortality.

Symptomatic and Asymptomatic patients (Table2): Higher number of asymptomatic COVID-19 cases 723(52.9%) observed compared to symptomatic cases 645(47.2%). Of the 645 symptomatic cases, 234(17.1%) were mild, 215(15.7%) were moderate and 196(14.3%) were severe cases. Compared to asymptomatic patients symptomatic were associated with higher Comorbid conditions like diabetes (81/157) and hypertension (85/184) and significantly increased inflammatory biomarkers like CRP, ferritin and LDH.

Table 1: Demographic features, Clinical findings and Outcome of COVID-19 patients (n= 1368).

Parameters	Values
Age (yr)	
18-45	679 (49.6 %)
46-60	481 (35.1 %)
>60	208 (15.2%)
Mean±SD	38.9±15.3
Gender %	
Male	812 (59.3%)
Female	556 (40.6%)
Co-morbidities %	
Diabetes	238 (17.3%)
Hypertension	268 (19.5%)
COPD	84 (6.1%)
Cerebrovascular disease	64 (4.6%)
Chronic kidney disease	34 (2.4%)
Chronic liver disease	21 (1.5%)
None	1004(73.3%)
Clinical findings	
Temperature , > 38ºC	1114(81.4%)
Percent oxygen saturation, room air	
<94	252 (18.4%)
>94	1116 (81.6%)
Respiratory rate (breaths/min)	
<24	899 (65.7%)
>24	469 (34.3%)
Heart rate	
<100 /minute	1085 (80.3%)
>100 / minute	269 (19.7%)
Admission to the ICU	289 (21.1%)
Clinical outcome (%)	
Cured	1084 (79.2%)
Death	191 (13.6%)

Table 2: Comparison of clinical and Laboratory characteristics of Asymptomatic and Symptomatic COVID-19 patients.

Clinical and Laboratory characteristics	Asymptomatic n=723	Symptomatic n= 645		
		Mild n=234	Moderate n=215	Severe n= 196
Age (yr), mean±SD	30.2±11.4	34.6±12.7	38.7±13.2	56.5±13.6
Age, (>60 yr)	31	58	46	73
Sex (male/female)	409/314	145/89	137/78	121/75
Hypertension (absent/present)	638/85	179/55	168/47	115/81
Diabetes (absent/present)	642/81	187/47	181/34	120/76
NLR, median (IQR)	1.82(1.35)	1.69(1.14)	1.57(1.05)	5.62(12.35)
CRP (mg/dl), median (IQR)	7.5(9.4)	8.9(12.6)	14.9(34.5)	37.5(158.4)
Serum ferritin (ng/ml), median (IQR)	64.7(126.5)	78.3(18.24)	129.5(354.8)	456.2(482.6)
LDH (U/l) (<333)	208(82.4)	227(49.6)	212(48.7)	385(263-645)

IQR- inter quartile range, NLR- neutrophil-lymphocyte ratio, CRP- C-reactive protein, LDH-lactate dehydrogenase.

Discussion

Since the outbreak of COVID-19 in Wuhan, China, it has rapidly spread around the world. The first case of COVID19 in India was reported on 30 January 2020 originating from China.[3] The prevalence of COVID-19 infection was increased daily in India and also among different countries in the world. Thus, the need to assess the pattern of clinical and demographic characteristics, disease severity, management and mortality required to limit the pervasiveness of this pandemic [9]. In this retrospective study, we attempted to interpret the distinct demographic characteristics, risk factors, laboratory markers associated with the severity and fatality of COVID-19 patients. Our findings in the study revealed the lower mean age of patients (38.9 ± 12.5 SD, year) compared to previously published reports (42-47yearr) from other authors [10,11] and slight male preponderance, Soni S L et al [12]also reported a similar age pattern in their study. In our study more asymptomatic (52.9%) patients at admission were seen compared to symptomatic (47.2%) patients. Most symptomatic patients had mild respiratory symptoms such as nasal symptoms, throat irritation and cough and only a small portion of them had dyspnea, Xu X et al [9] also reported similar findings in their study.

Fever was present in 81 per cent of our patients, Which was comparable to other reports across the globe [9,10,11]. The study conducted by Jain P et al [13] is focused on the early part of the COVID-19 pandemic, the most common presenting complaints were fever, cough, and breathlessness. Fever was the most common symptom noted in around 80% of the patients, breathlessness was observed in 74.2% of the severe COVID patients and 59.4% of the nonsevere COVID patients (P = 0.21). Our study findings correlate with these results. An increase in non-respiratory symptoms like diarrhoea and vomiting was seen in some of the other studies [12,13]. However, our data did not reflect any such clinical findings. In our study Patients aged 45-59 years were noted to have associated with more than one comorbidity. Increased incidence of severe COVID-19 disease associated with underlying co-morbidities such as hypertension, diabetes, chronic liver and kidney diseases. Similar findings have been reported from many other studies [12-14]. Highly elevated levels of inflammatory markers (CRP, Ferritin, LDH) were noted among patients with underlying comorbidities as compared to those without comorbidities. Panagiotis Paliogiannis et al [15] and Elena Aloisio et al [16] also reported comparable laboratory test results. Ferritin and CRP are acute-phase proteins that may reflect the hyper inflammatory state induced by SARS-CoV-2 active infection, LDH activity in serum may reflect both lung damage and more widespread tissue damage. [8].

A study conducted by Iroungou BA [17] in Gabon revealed the relative mortality rate for patients with COVID-19 is estimated to be low (0.6%) according to national statistics. The lower mortality rate observed in the study may be a result of its conduction within a tertiary referral hospital that admits patients with severe COVID-19 symptoms. They examined parameters associated with fatal outcomes in 12 of 31 patients (38.7%) admitted to the intensive care unit. The only parameter significantly associated with death was older age. The median age of deceased Gabonese patients was 52.5 years. In our study, we also analyzed patients with symptoms for more than 10 days after illness onset. We found that the clinical features of patients with symptoms for longer than 10 days were less severe than those of the primary infected patient. 21.1% of patients had intensive care unit (ICU)admission, 19.2% were cured of COVID-19 and discharged and 13.6%

Cases had mortality. Concerning comorbidities, diabetes and arterial hypertension were more prevalent in individuals who died than in those who recovered, although the differences were not statistically significant. Numerous other studies have reported a positive association between mortality and diabetes or arterial hypertension. [15,17,18]. Trupti Ramteke et al [19] reported, diabetes and hypertension in both non-severe and severe groups but the incidence were higher in the severe group {diabetes mellitus (41.0%) vs (36.1%); hypertension (42.8%) vs (36.1%)}. Their study suggested that serum IL-6, serum ferritin and plasma D-dimer can be helpful in monitoring of COVID-19 patients for early identification of severe cases which can be useful to reduce or prevent progression towards critical stage and mortality by using early clinical and therapeutical interventions based upon these biomarkers. Sarkar, A et al [20] in their study collectively demonstrate that the analysis of viral clade distribution is important to understand changes in COVID-19 clinical manifestations over time. The most frequently used categories of prognostic factors (for any outcome) included age, comorbidities, vital signs, image features, sex, lymphocyte count, and C reactive protein. Our study also used these prognostic factors for outcome analysis.

Limitations: Our study has some limitations. Some patients were excluded because of incomplete documentation of required clinical, laboratory and radio imaging data. The study was limited to the in-hospital clinical course only and follow up details were not available; thus, information of relapses was not reported. Furthermore, by being a tertiary Centre and not accepting patients directly, the majority of the patients had the mild-to-moderate disease; the spectrum of severe illness was underrepresented.

Conclusion

Our study findings demonstrated that asymptomatic COVID-19 patients have better outcomes than symptomatic patients. This may have been due to more active cellular immune responses and normal liver function. Since asymptomatic patients have no clinical symptoms which can easily prevent timely diagnosis and treatment, they may cause a greater risk of virus transmission than symptomatic patients, which poses a major challenge to infection control. Patients with comorbidities were more vulnerable to disease severity and critical condition.

What does the study add to existing knowledge: We observed many variations in COVID-19 patient's characteristics. Regarding the clinical features, fever remained the most common symptom in the first wave. Old age, diabetes, hypertension, chronic liver disease and chronic kidney disease tended to have higher disease severity. Our results add to the growing literature that inflammatory markers are elevated in those with severe illness and indicated a risk of mortality. Inflammatory markers such as CRP, serum ferritin, and NLR may be used to predict disease severity, especially in resource-limited settings where other markers such as IL-6 and troponin -I are not affordable or have limited availability.

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Contribution from the Author: Jagadevi: Data Collection, methodology, Project administration, Investigation, Analysis and preparation of Manuscript. **Sumanta A:** Investigation, Analysis and Preparation of the Manuscript. **Shubha D S:** Project administration, Resources. **Sudhindra KS**: Project administration, Resources. **Sai Priya B:** Analysis and Preparation of the Manuscript.

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