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Study of Epidemiological Characteristics of the SARS-CoV-2 Pandemic in Hassan District, Karnataka,India

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Abstract
Background and Objective: In late December 2019, a novel corona virus (SARS-CoV-2) emerged in China and rapidly spread globally including India. Data on epidemiology of COVID 19 was limited during initial periods of outbreak in India. This study describes the epidemiological characteristics of COVID-19 patients in a District of South India.**Methods:** This prospective ,observational study included patients fulfillingWHO case definition of COVID-19 and confirmed to have SARS-CoV-2 infection by reverse transcription- polymerase chain reaction(RT-PCR) admitted between May, 2020 and July 2020.The demographic and epidemiological data was collected and analyzed.**Results:** Out of 1376 patients were admitted, the age group most affected was 31-40 years and 62% were male,73.69% were asymptomatic. Fever(46.4%) ,cough (38.95%) and dyspnea (22.92%) the most common presentation. 88.51% of the patients didn't have any comorbidities. Diabetes Mellitus was the most common comorbidity.21.72% had history of travel with a positive case.**Conclusion:** This study revealed ,COVID 19 affecting younger age, males ,majority being asymptomatic and Diabetes Mellitus to be the major comorbidity.
Keywords: Epidemiology, Covid-19, Karnataka

Introduction

There is an ongoing pandemic of viral pneumonia called Corona virus Disease 2019 (COVID-19) which is caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) infection[1].At the end of 2019, several cases of pneumonia with unknown etiology emerged in Wuhan, Hubei Province,China.The pneumonia spread quickly to other provinces of China and overseas. At early stage, it was reported that most patients had the contact history with Hunan seafood market[1-4].On 7 January 2020, a novel corona virus was identified in the throat swab sample of one patient by the Chinese Center for Disease Control and Prevention (CDC), and was subsequently named as 2019 nCoV by World Health Organization (WHO). As the situation got worse, the WHO declared the outbreak as the public health emergency of international concern(PHEIC)[5]. On 11 February 2020, the International Committee on Taxonomy of Viruses renamed the virus as severe acute respiratory syndrome coronaviruse-2(SARSCoV-2) And WHO announced the epidemic disease caused by SARS-CoV-2 as corona virus disease 2019 (COVID-19)[6,7].In the context of the rapid spread of COVID-19, a full understanding of the epidemiological characteristics of this infectious disease is crucial in epidemic control and public policy implementation. Furthermore, considering the changes in susceptible populations, exposure opportunity and intervention of disease as epidemic progresses in different locations, the epidemiological characteristics of disease should hence be estimated.

The epidemiological features,demography of clinical presentation and outcomes of patients with COVID-19 have been variable in different countries.Hence, this study has been taken up to understand the epidemiology of COVID- 19 patients admitted in a Dedicated COVID- Hospital (DCH) in South India.

Material and Methods

This is a prospective,observational study conducted in a tertiary care teaching Hospital Karnataka, India which is designated as a Dedicated COVID-Hospital(DCH) as per government policy[8].

Hence all the cases of this district were referred for admission during our study period from May 2020 to July 2020.The approval of Institutional Ethics Committee was taken .Patients were received in a screening area, evaluated on arrival and triaged to isolation ward.All patients who fulfilled the WHO case definition of SARS-CoV-2 infection were included[9].A confirmed case of COVID-19 was diagnosed by a real-time reverse transcription polymerase chain reaction (RT-PCR) of the nasopharyngeal and oropharyngeal swabs. The data was obtained prospectively for all admitted and referred cases representing all the cases of the district during study period.The following data was obtained from the case history and available clinical investigation of the patients by manual as well as electronic data record-keeping system.

1) Demographic information including age, gender, and type of symptoms were included in our analysis.

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2) Epidemiological history includes history of travel or residence in other regions and contact history of confirmed cases. According to whether the patient had a travel or residence history in other regions within 14 days before diagnosis.

3) Clinical manifestations:Fever,cough, cold, sore throat, breathlessness, chest pain.Asymptomatic cases consists of both true asymptomatic infections and cases who had not yet developed symptoms at the time of data collection.

4)Presence of any comorbid illness like hypertension, diabetes, coronary artery disease, tuberculosis,chronic obstructive pulmonary disease, bronchial asthma, chronic kidney diseases (CKDs), seizures, dyslipidemia was also noted down.

The data were entered in a Microsoft Excel spreadsheet. The variables were presented as frequency and percentages (n; %).

Results: A total of 1376 patients were analyzed in the study. The demographic & epidemiological characteristics are shown in **Table 1**.

Table 1:Demographic &epidemiological characteristics

Characteristics	Number, n (%)
Age groups in years	
< 10	77(5.59%)
10-20	131(9.52%)
21-30	296(21.51%)
31-40	339(24.63%)
41-50	237(17.22%)
51-60	157(11.40%)
61-70	103(7.48%)
71-80	28(2.03%)
>80	8(0.58%)
Gender	
Male	860(62.42%)
Female	518(37.57%)
History of travel (Total)	
• Alone	70(5.08%)
• With primary contact	299(21.72%)
• With secondary contact	6(0.43%)
History of contact	
Primary	195(14.17%)
secondary	1(0.072%)

The most common age group was 31-40 years, least affected age groups were <10 and > 80 yrs. 62% were males .

Contact /travel history of confirmed cases : History of travel from different states is shown in **Fig 1.**Majority of the cases travelled from Maharashtra. 27.2 % Out of 1376 cases had a travel history. Out of which 21.72% travelled with a primary contact.
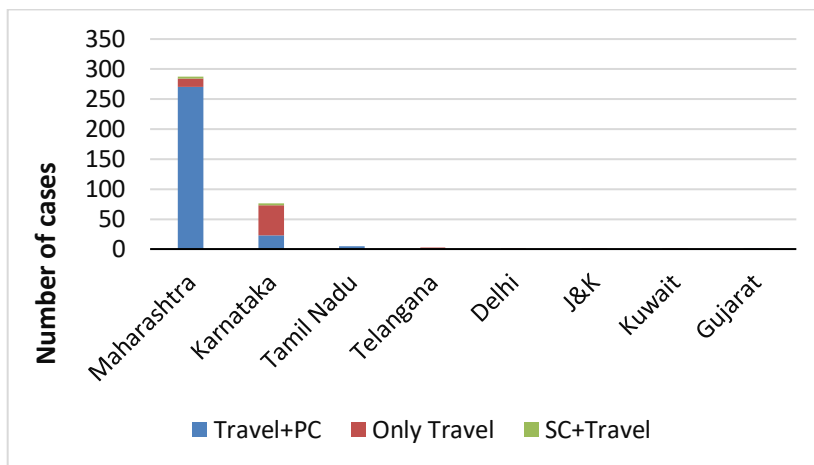

Fig 1:Areawise distribution of travel

As shown in **Table 2.** 73.69% were asymptomatic, fever was major symptom in 43.4% and skin rash was a least common symptom.Only 11.7% of the patients had comorbidities **(Table 2.)**Diabetes Mellitus being the major comorbidity followed by hypertension.

Table 2:Characteristics and number

Characteristics	Number, n (%)
Asymptomatic	1014(73.69 %)
Clinical Symptoms	362 (26.3%)
Dyspnea	83(22.92%)
Cough	141(38.95%)

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Chest pain	4(0.29%)
Haemoptysis	0
Joint pains	24(6.6%)
Sore throat	44(12.1%)
Skin rashes	1(.072%)
Fatigue	10(0.72%)
Rhinitis	49(13.5%)
Fever	168(46.4%)
Comorbidities	
COPD	4(0.29%)
Diabetes	105(65.21%)
Hypertension	75(5.45%)
CAD	11(0.79%)
Past H/o Tuberculosis	0
Chronic Renal Failure	11(0.79%)
Asthma6	6(0.43%)
Rheumatoid Arthritis3	3(0.21%)
Seizures	2(0.14%)
Dyslipidemia	0

Discussion

India is the world's second most populous country and the largest in south Asia, with a population of nearly 1·4 billion, To contain the outbreak of COVID-19, the Indian Government imposed a countrywide lockdown for 40 days initially, and extended this by 8 weeks with gradual relaxation[10].COVID-19 infection was introduced into the state by people travelling from foreign countries until the country went into lockdown in the fourth week of March 2020. This study has analyzedepidemiologic and demographic characteristics of 1376 COVID -19 patients from a Tertiary care teaching hospital, a Dedicated COVID Hospital in South India. The infection was observed mainly in the age group of 31–40 years with male preponderance .It may be due to their outdoor activities and travel. The exact mechanism for the higher risk in men compared with women is still unclear; however, studies have suggested that the higher level of angiotensin-converting enzyme-2 (ACE2) in men might interact with viruses, rendering them susceptible to the infection.Similar results were observed in a study conducted in North India[9].The majority of cases were mainly attributable to domestic travel during initial phase of epidemic suggesting this as the important mode of introduction of COVID -19 into the district . It is presumed that these subjects had acquired the infection at the place where they initiated their travel. Alternatively, they might have acquired it during their travel.Our study population had 73.69 % asymptomatic subjects. This may be a cause of concern as these asymptomatic patients are potential carriers or transmitters of infection in the community. A studyestimating the asymptomatic proportion of COVID-19 reported similarity in viral loads between asymptomatic and symptomatic patients and the possibility of transmission of COVID infection by asymptomatic cases . There has been considerable debate on the role of asymptomatic and symptomatic persons in spreading the SARS-CoV-2 infection. However, the WHO acknowledged later that there is a growing body of evidence that even asymptomatic persons can spread the disease.[12] In contrast to our study , a surveillance report from a state found that the symptomatic cases were the prime drivers of the SARS-CoV-2 transmission within the state during the early phase of the pandemic[13]. The common symptoms like fever and cough in this study were similar to other studies[14,15]. In contrary to other Indian studies where hypertension was most common comorbidity, this study showed Diabetes Mellitus followed by hypertension[14]. The cases were initially detected in the capital city of Karnataka ,Bengaluru and later spread to people in the other districts, either by contact in Bengaluru or by travelling to other districts. Most of the cases were from Maharashtra state during earlier part of pandemic in the district.

Limitations

The longitudinal data of asymptomatic cases was not collected in the study. There were chances of appearance of symptoms among asymptomatic cases with long incubation period. As the study was conducted in the early period of the pandemic when large number of infections occurred due to travel from different states,the criteria for testing ,admission and home isolation were being modified later. Hence the data during the study period cannot be extrapolated to the later phases of pandemic in the district.

Conclusion

The findings of this study highlighted theepidemiological and demographic characteristics of early phase of COVID 19 in a South Indian district. The important factors that contributed for spread appear to be younger age,males and asymptomatic cases. The identification of risk factors for COVID-19 severity and mortality in this study could be helpful for early surveillance and monitoring in susceptible population.

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