

Original Research Article


Clinical characteristics and outcome of covid-19 patients at government tertiary care institution in Vellore, Tamil Nadu, South India

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Abstract

Background: COVID-19 is a highly contagious disease of worldwide health concern, caused by SARS-CoV-2 which was declared a global pandemic by WHO in 2020.

Aim and objective: To determine the presenting patterns of COVID-19 cases admitted in our institution, from March to August 2020 and describe their Clinico-Epidemiological pattern and outcome.

Materials and methods: Retrospective descriptive analysis of data extracted from medical records of 6609 patients with RT-PCR Proven COVID-19 patients between March to August 2020 in Government Vellore Medical College and Hospital. We extracted clinical data, Age/gender distribution, and outcome (discharge or death). Logistic regression was used to examine factors associated with mortality. The proportion of Asymptomatic, Symptomatic cases, and the case fatality rate was computed. Among symptomatic cases analyzed trends in symptoms, signs, and clinical outcome.

Results: Between March to August 2020, a total of 6609 RT-PCR confirmed COVID-19 cases were admitted, of which 6432 (97%) were discharged. 177 (2.6%) expired, 5251 (80%) were asymptomatic and 1358 (20%) symptomatic. There was male predominance with 4002 (61%), female 2607 (39%) & 1 transgender (0.01%). Predominant co-morbidities were Type 2 Diabetes Mellitus 893 (13.5%) &

Hypertension 770 (12%) followed by COPD 13 (0.15%) and CAD 116 (1.83%). The mean age of patients was 45 ± 7.2 years. The mean hospital stay & onset of symptoms was 5.92 ± 4.62 and 5.82 ± 4.68 days respectively.

Conclusion: Overall cure rate was 97.6%. Factors contributing to early death included the presence of co-morbidities, dyspnea at presentation, prolonged fever, lung involvement by imaging, refractory hypoxia requiring ventilator assistance.

Key words

COVID-19, Epidemiology, Co-morbidity, Outcome, Symptomatic, RTPCR.

Introduction

COVID-19 is a highly contagious viral disease of worldwide health concern, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was declared a global pandemic by the World Health Organization in 2020 [1]. Patients with COVID-19 generally present with mild symptoms, but manifestations can vary from asymptomatic to severe condition with acute respiratory distress syndrome (ARDS) [2]. The first case of COVID-19 was reported in India on January 31, 2020, and by July 31, 2020, more than 1.6 million patients were diagnosed as COVID-19 and more than 36,000 patients died [3]. As of May 2021, the total number of confirmed cases in India is 28 Million with a case fatality rate of 1.18% [4]. The epidemiology of COVID-19 depends on various factors like location, weather, public behavior, social awareness, and local governmental health policies. In our study, we aimed to describe the epidemiology, clinical characteristics, and treatment outcomes of the hospitalized patients of RT-PCR confirmed COVID-19 in a Government Tertiary care Institution in Vellore, South India. A study by Li, et al. reported that the mean age of 425 patients infected with COVID-19 was 59 years, of which 56% were men. The mean incubation period was 2.5 days, and almost half of the adult patients were 60 years and older. In the early stages, the number of infected patients doubled every 7.4 days. The production rate of transmission (R_0) of the disease from the infected person was 2.2. The incubation period for COVID-19 is thought to be 14 days after exposure, with most cases

occurring approximately 4 to 5 days after exposure [5]. Available data suggest that in India, 69% of cases are asymptomatic, while less than 15% of active cases need hospitalization [6]. The currently available evidence for COVID-19 suggests that the causative virus (SARS-CoV-2) has a zoonotic source closely related to bat-origin SARS-like coronavirus [7]. It is an enveloped RNA beta coronavirus related to the Severe Acute Respiratory Syndrome (SARS) virus, and the virus has been shown to use the angiotensin-converting enzyme 2 (ACE2) receptor for cell entry [8]. The persons infected by the novel coronavirus are the main source of infection [9]. At present, the majority of the transmission is believed to occur predominantly through the airborne route and droplet released when the infected person coughs, sneezes or talks [10]. These droplets may also land on surfaces, where the virus has been seen to remain viable for a variable duration of time depending on the type of surface. Infection can also occur if a person touches an infected surface and then touches his or her eyes, nose, or mouth (known as fomite transmission). The median incubation period is 5.1 days (range 1–14 days). The precise interval during which an individual with COVID-19 is infectious is uncertain. As per the current evidence, the period of infectivity starts 2 days before the onset of symptoms and declines rapidly within the first week of symptom onset [11, 12]. COVID-19 patients reporting to various Covid treatment facilities have reported the following signs and symptoms: Fever, cough, general weakness/ fatigue, headache, myalgia, sore throat, coryza, dyspnoea, anorexia, nausea, vomiting, diarrhea, altered mental status, loss of

smell (anosmia) or loss of taste (ageusia) preceding the onset of respiratory symptoms have also been reported. Loss of smell has been shown to increase the pre-test probability of the presence of SARS-CoV-2 [13]. Older people and immuno-suppressed patients, in particular, may present with atypical symptoms such as fatigue, reduced alertness, reduced mobility, diarrhea, loss of appetite, delirium, and absence of fever. Children might not have fever or cough as frequently as adults [14, 15].

Materials and methods

This was a retrospective cohort study to assess demographic and clinical factors associated with mortality of adults and children hospitalized with COVID-19 in Vellore, Tamil Nadu, India. The study population included all RT-PCR confirmed COVID-19 patients recorded by the Medical Records section, who either died or were discharged alive between March 2020 and August 2020. Following ICMR COVID-19 guidelines, confirmatory SARS-CoV-2 PCR testing was conducted on Nasopharyngeal and/or oropharyngeal swab specimens in COVID-19 reference laboratories, and patients were discharged from hospital consecutive to RT-PCR negative tests. This study was conducted as a single centered, retrospective, observational study, during March and August 2020, including all patients who were diagnosed as COVID-19 positive via either nasopharyngeal or oropharyngeal swab for PCR. The diagnostic kit used is LabGun COVID-19 ExoFast RTPCR Kit, which is an in vitro diagnostic test based on reverse transcriptase PCR technology for the amplification and detection of RdRp gene and N gene from SARS CoV-2 in an oropharyngeal and nasopharyngeal swab. The sensitivities of RTPCR via using nasal and oropharyngeal swabs have previously been discussed. Once admitted, the patients were monitored for their disease course and the outcome was followed subsequently. Two-thirds of the patients were admitted to the ward with mild signs and symptoms, while the rest one-third showed moderate to severe disease progress in ICU.

Statistical analysis

Statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA, version 23.0 for Windows) and Microsoft Excel 2016. For normally distributed data, means were compared using an independent *t*-test. Mann-Whitney U-test was applied for statistical analysis of skewed continuous variables and ordered categorical variables. Univariate and multivariate logistic regression analyses were performed to analyze the effect of comorbidities (age >60 yr, diabetes mellitus and hypertension) on the severity of COVID-19. Mortality as an outcome measure could not be used as its number was low.

Results

The study was conducted between March and August 2020, a total of 6609 RT-PCR confirmed COVID-19 cases were admitted In Govt. Vellore Medical College Hospital, of which 6432 (97%) were discharged. 177 (2.6%) patients expired, 5251 (80%) were asymptomatic, 1358 (20%) were symptomatic. By gender, male predominance was noted, total of 4002 (61%) males, 2606 (39%) females and 1 (0.01%) transgender. Type 2 Diabetes 893 (13.5%) and Systemic hypertension 770 (12%) were the predominant co-morbidities, followed by COPD 13 (0.15%) and CAD 116 (1.83%). The mean age of patients was 45 ± 7.2 years. The mean hospital stay and onset of symptoms was 5.92 ± 4.62 days and 5.82 ± 4.68 days respectively (Table – 1, Chart – 1, 2, 3, 4, 5).

Discussion

Coronaviruses are a large group of RNA viruses that cause illness in humans and animals. Rarely, animal coronaviruses can evolve and infect people and then spread between people such as has been seen with MERS and SARS [16]. As of May 31, 2021, there were around 171 million global cases of COVID-19. Around 153 million people had recovered from the disease, while there had been over 3.5 million deaths in almost 200 countries /territories and 26 cruise /naval ships [17]. The United States, India, and Brazil

have been among the countries hardest hit by the pandemic. Tamil Nadu confirmed around two million cases of the coronavirus (COVID-19) as of May 30, 2021, with over 23 thousand fatalities case fatality rate 1.18% and over 1.7 million recoveries (99%). India reported more than 28 million confirmed cumulative cases, including this state that same day [18]. This retrospective hospital-based study described the complete epidemiological surveillance data of the RT PCR Confirmed COVID-19 Patients, including 6609 adults admitted at Govt. Vellore Medical College and Hospital during the first 6 months of the SARS-CoV-2 pandemic. The observed disease pattern broadly reflects that reported globally, with patients usually presenting with multiple symptoms of fever, cough, malaise, and/or shortness of breath. Overall mortality was 2.67% (177/6609), and deaths occurred across all ages. Although the majority (55%) of all admissions were younger than 45 years, including 5% children, the large majority (60%) of people who died were 60 years or older. Mortality increased with age, from 7% in patients aged 30–44 years to 60% in patients aged ≥ 60 years. No Mortality among children was reported in our hospital [19]. As per the guidelines for clinical spectrum, 81% were asymptomatic, 11% were mild symptomatic, 7% were moderately symptomatic and 2% severely symptomatic. The mean hospital stay & onset of symptoms was 5.92 ± 4.62 days and 5.82 ± 4.68 days respectively. Of the total patients studied in 1985(29%) had at least one co-morbidity while 4767 (71%) had no comorbid status [20].

Screening Chest X-Ray in symptomatic patients showed bilateral lung involvement in 241(19%) & unilateral involvement in 137(10%). 71 (1.3%) in the asymptomatic group showed unilateral lung involvement. Most of the deaths occurred in the 60-80 years age group 108(60%), followed by the 45-59 years age group 56(31%). In the 60-80 years age group 101 (87.9%) & in the 45-59 age group 29 (51.7%) had at least one co-morbidity [21]. In the present study, elevated Neutrophil-Lymphocyte Ratio and lymphopenia were observed among non-survivors compared to survivors. Higher neutrophil count and prolonged prothrombin time have been reported as ominous prognostic markers by previous authors. Presentation with dyspnoea, prolonged fever, elevated NLR ratio with bilateral chest involvement in imaging was predicted risk factors for mortality. The severity of illness was an important factor than the demographic pattern in predicting early mortality [22]. Elevated risk of in-hospital death was independently associated with elderly age group of >60 years (60%) Male gender (73%) Hypertension (4%), Diabetes (9%), Coronary artery disease (40%), Chronic kidney disease, multiple (>3) symptoms at presentation, immediate ICU admission, and mechanical ventilation. The increased risk of in-hospital death associated with advancing age was further augmented by the presence of one or more chronic comorbidities, which were recorded in 63% of patients [24, 25]. Limitations include the possible presence of superadded bacterial infections and the severity of preexisting illnesses which were not recorded.

Table - 1: Incidence of covid -19 cases by age distribution.

AGE	TOTAL	DISCHARGED	PERCENTAGE	DEATH	PERCENTAGE
<5	76	76	1%	0	0
5-14	201	201	3%	0	0
15-29	1456	1453	22%	3	2%
30-44	1857	1846	29%	11	7%
45-59	1756	1701	27%	55	31%
>60	1263	1155	18%	108	60%

Chart - 1: Symptomatic and asymptomatic pattern of covid-19.

SYMPTOM ANALYSIS

■ Symptomatic ■ Asymptomatic

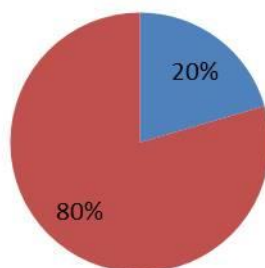


Chart - 2: Most common clinical manifestation of covid-19.

CLINICAL PRESENTATION

■ COUGH ■ FEVER ■ BREATHLESSNESS ■ DIARRHOEA ■ MYALGIA

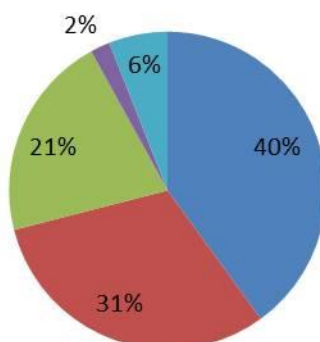


Chart - 3: Clinical outcome of covid-19 by gender distribution.

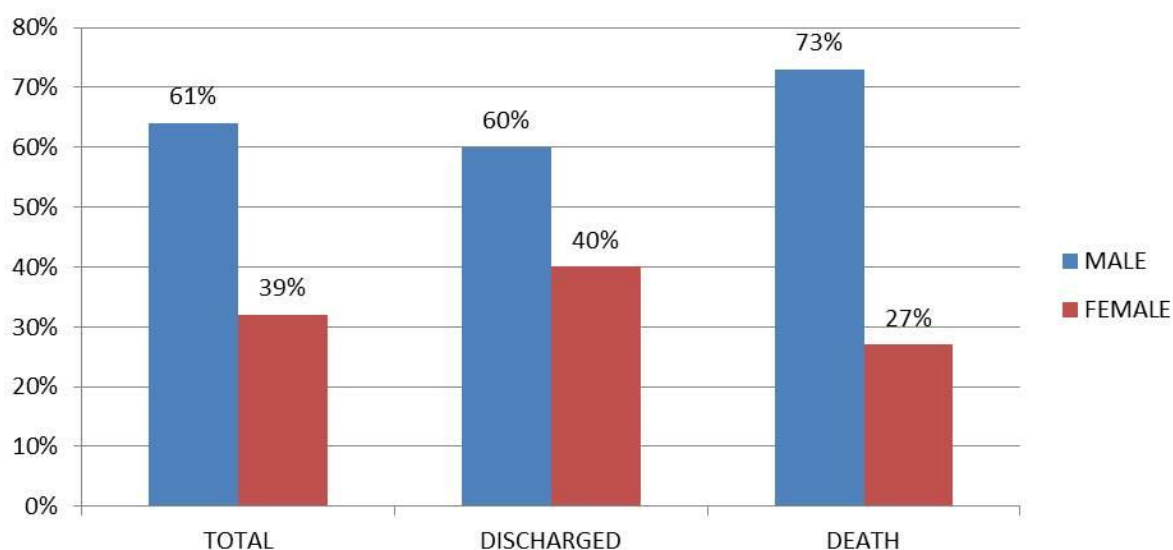


Chart - 4: Distribution of covid-19 with co morbidity.

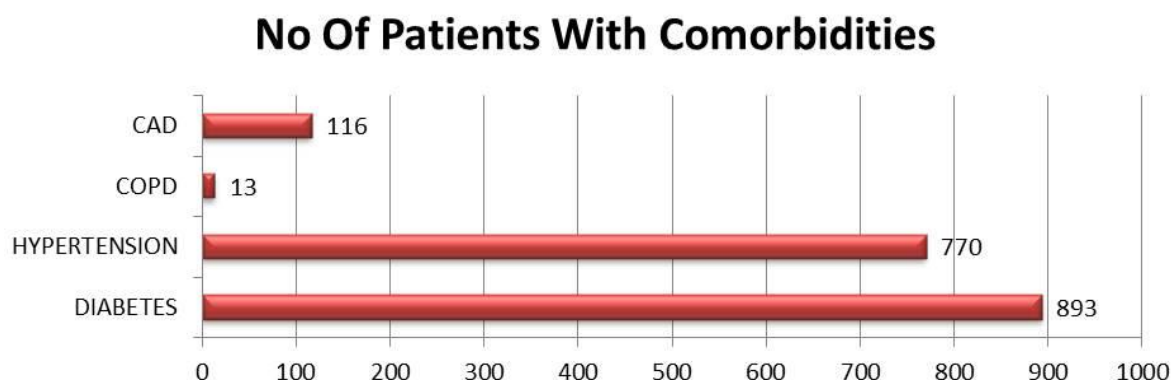
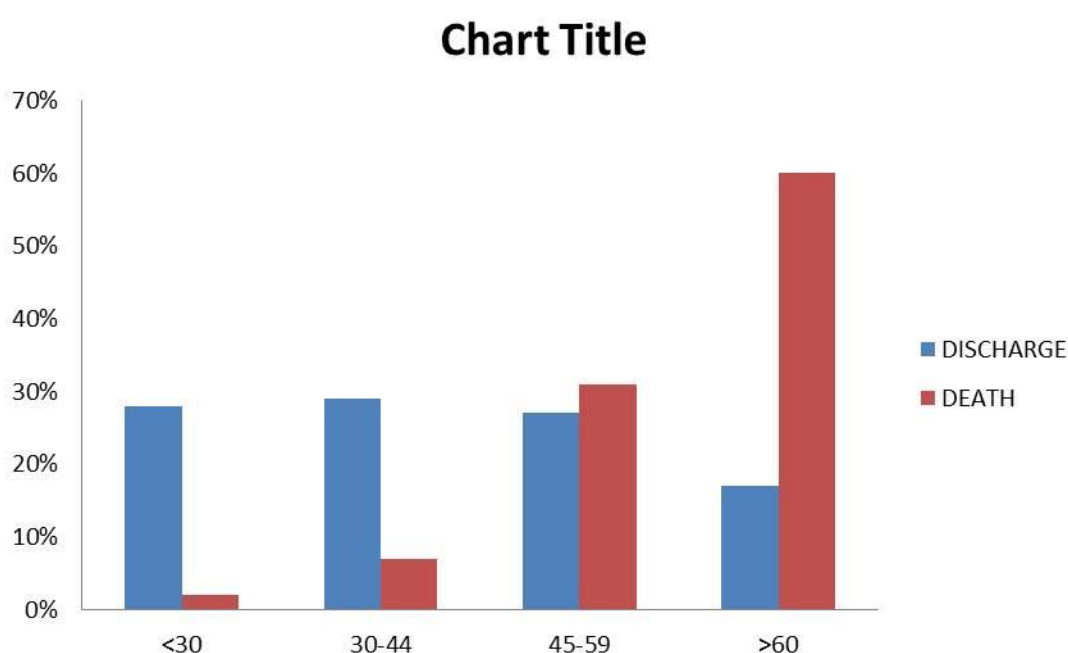


Chart - 5: Age wise distribution of discharge and mortality.



Conclusion

COVID-19, like other viral diseases, can involve different organs of the body with different severity. In the meantime, it has a lot in common with other viral diseases and there are some common points. Its differences include its high infectivity. Our study shows the pattern of Asymptomatic (80%) and symptomatic (20%) among which cough (40%) and fever (31%) are the main symptoms. Males (61%) are predominantly affected than females (39%), Type 2 Diabetes and Systemic Hypertension were the most commonly associated co-morbidities. As for the treatment, the standard regimen includes an antibiotic, steroids, and

anticoagulants, and recently introduced antiviral drugs, and many therapies with preliminary good clinical response, are being tested in clinical trials. We hope that increased awareness of the virus and ongoing clinical trials can help to find effective treatment against SARS-CoV- 2. The overall mortality of SARS CoV- 2 remains to be established in the future because a large number of confirmed and suspected cases are still in the hospital.

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