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Research Article

CLINICAL PROFILE AND OUTCOME OF COVID-19 PATIENTS: A RETROSPECTIVE OBSERVATIONAL STUDY FROM TERTIARY CARE CENTER IN NORTH INDIA

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ABSTRACT

Objective: An acute respiratory infection of unknown origin was first detected in Wuhan, China, and reported to the WHO on December 31, 2019, and within a month, this outbreak was declared as a Public Health Emergency of International Concern. This study was carried out with an objective to assess the spectrum of clinical presentations and host-related factors in outcome of COVID-19 during the first wave.

Methods: This study was a retrospective observational study on 427 laboratory conformed COVID-19 cases at tertiary care center in North India during 6 months of the first wave. The demographic data, clinical profiles, comorbid conditions, treatment given, duration of hospital stay, and outcome were collected on a predesigned pro forma by the investigator himself and entered a Microsoft Excel sheet and analyzed using SPSS version 17.0 software.

Results: Mean age of the study participants was 48.70 years. Majority (34.89%) belonged to above 60 years. About 74% were male. Mean duration of symptoms before detection was 1.30 and mean duration of hospital stay was 11.98 days. Majority had fever (73.54%) followed by myalgia (49.88%). About 85.48% had more than 3 symptoms and 69.32 had symptoms for less than 3 days before getting detected. About 40.52% had comorbidities and only 14.05% had history of contact with COVID confirmed case. Only 8.2% were asymptomatic while 23.19% had severe symptoms. Majority 91.57% were admitted to hospital while only 8.43% were put under home isolation. About 74% were positive on rapid antigen test (RAT) while 29.51% needed RT PCR test to turn positive. About 28.1% had bilateral pneumonia on chest X-ray findings. About 6.3% of were pregnant ladies. The overall mortality rate of our hospital during that 6-month period was 4.69%. Out of all parameters, only age category was statistically significant associated with outcome on discharge while other variables such as comorbidity, symptom duration, and severity of disease during admission did not show any statistically significant association.

Conclusion: This single-center study provided the spectrum of clinical presentations and host-related factors in outcome of COVID-19 during the first wave which may help in decrease the burden of disease, minimize social disruption, and reduce the economic impact associated with a pandemic. Early detection, admission, and treatment of individuals with comorbidities and elderly would increase the recovery from the disease, thereby reduce mortality.

Keywords: Clinical profile, Outcome, COVID-19.

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INTRODUCTION

An acute respiratory infection of unknown origin was first detected in Wuhan, China, and reported to the WHO on December 31, 2019, and within a month, this outbreak was declared as a Public Health Emergency of International Concern. A joint mission of WHO-China revealed that it is a zoonotic disease, caused by family of coronavirus, an enveloped RNA virus of 2B lineage, and named as COVID-19 (by WHO) or severe acute respiratory syndrome coronavirus 2/SARS CoV2 (by the International Committee on Taxonomy of Viruses) [1]. It belongs to the same family of viruses which has caused two recent outbreaks of viral pneumonia, namely, severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS). It has been suggested that the disease transmission to human being occurred from wild animals illegally sold in the Huanan Seafood Wholesale Market [2]. In spite of being epicenter of the pandemic and largest populated country in the world, China has cleverly managed and relatively escaped from the disaster. The disease knocked Europe and America very soon and annihilated badly than other countries.

The very first case of COVID-19 in India was diagnosed on January 30, 2020. Since there was limited knowledge on this new disease, the social distancing, use of face mask, and hand hygiene etiquettes were practiced as a general rule of thumb and the lesson learned from previous pandemic. Ministry of Health and Family Welfare in conjunction with Indian Council of Medical Research (ICMR) and All India institute of medical sciences (AIIMS) laid down the guidelines [3] for COVID-19 and amended it time to time as and when needed. All the state government stood together with central govt. for the war against corona. Apart from night curfew, odd-even days of working, and working with half strength, it became imperative for government to implement nationwide lockdown and to stop interstate movements. Many Non-Governmental Organizations (NGOs) and philanthropists came front to provide food and shelters for yeoman's service. Mass communication in the form of health education and expert advice on television and audio channels and free voice and text messages on mobile phones was introduced. Even with the excellent national preparedness and strong political will, the inequalities in health infrastructure and education, socioeconomic and cultural disparities, it was tough for the nation to contain the pandemic [4]. The migration of interstate workers and laborer communities after exemption from countrywide lockdown implemented by the central government fueled the community transmission of the exponentially rising disease [5]. Later, many districts were divided into red, orange, and green zones to stratify the endemicity of infection.

The prevalence of the disease, the clinical presentations, and outcome had not been uniform among different demographic and geographic strata.

Various host-related and environment-related factors [6] attributed partial resilience against the disease which can be vividly seen as the number of cases and the mortality per billion of population was much less as compared with most other countries in the world [7]. It has also come into light that larger proportion of older patients and those with associated comorbid conditions had worse outcomes and case fatality among patients who received ICU care was high (37%–49%) [8]. The aim of this study was to assess the spectrum of clinical presentations and host-related factors in outcome of COVID-19 during the first wave.

METHODS

This study was a retrospective observational study on 427 laboratory conformed COVID-19 cases admitted to and managed at tertiary care center in North India during 6 months of first wave. The study assessed the sociodemographic, clinical presentation, and treatment outcome of COVID-19 cases. Initially, all suspected cases and those with contact with confirmed cases were tested using RT PCR conducted at a designated laboratory situated 120 km away from our institution. With the availability of CB-NAAT (Cartridge-based nucleic acid amplification test) and later RAT (rapid antigen test) at our center, the RT-PCR was reserved as second line of test. The techniques of sample collection, transport, and testing were carried as recommended by the WHO. Treatment of confirmed cases was done as per the Directorate General of Health Services, MoHFW, and GOI Comprehensive Guidelines for Management of COVID-19 patients [4]. The severity of COVID-19 was classified into asymptomatic case (a laboratory-confirmed case of COVID-19 without any signs and symptoms); admitted in COVID isolation ward 1, mild case (a laboratory-confirmed case with one or more of the following signs and symptoms but without shortness of breath and normal SpO2 (>94%) on room air: Fever, cough, malaise, rhinorrhea, anosmia, sore throat, or lethargy); admitted in isolation ward 2, moderate case (a laboratory-confirmed case with any of the following features: Respiratory rate >24/min, SpO2 <95% in room air, altered sensorium, or hypotension [systolic blood pressure (SBP) <90 mmHg or diastolic blood pressure (DBP) <60 mmHg]; admitted in high dependency unit (HDU), and severe case (a laboratory-confirmed case with any of the following features respiratory failure, shock, or multiorgan dysfunction); admitted in ICU. The demographic data, clinical profiles, comorbid conditions, treatment given, duration of hospital stay, and outcome were collected on a predesigned pro forma by the investigator himself and entered a Microsoft Excel sheet and analyzed using SPSS version 17.0 software.

RESULTS

Mean age of the study participants was 48.70 years. Majority (34.89%) belonged to above 60 years. About 74% were male. Mean duration of symptoms before detection was 1.30 and mean duration of hospital stay was 11.98 days (Table 1). Majority had fever (73.54%) followed by myalgia (49.88%). About 85.48% had more than 3 symptoms and 69.32 had symptoms for less than 3 days before getting detected. About 40.52% had comorbidities and only 14.05% had history of contact with COVID confirmed case. Only 8.2% were asymptomatic while 23.19% had severe symptoms. Majority 91.57% were admitted to hospital while only 8.43% were put under home isolation. About 74% were positive on rapid antigen test (RAT) while 29.51% needed RT PCR test to turn positive. About 28.1% had bilateral pneumonia on chest X-ray findings. About 4.79% succumbed due to COVID-19 in hospital (Table 2).

In our study, predominant comorbidities among patients ranged from diabetes (17.3%), followed by cardiovascular diseases – hypertension (13.5%), coronary artery disease (8.4%), chronic respiratory conditions/COPD (1.4%), hypothyroidism (2.8%), chronic kidney disease (3.5%), seizures disorders (2.1%), and anemia (0.7%). About 6.3% of were pregnant ladies.

DISCUSSION

As per the World Health Organization status data, India is one of the 11 nations to have more than 0.1 million COVID-19 cases as on May 19, 2020 [9]. In spite of the exponential escalation in number of cases, the overall number is less as compared with top other countries in the world if we consider number of cases as per billion population. The mortality rate is also lesser compared with most other countries in the world [7]. This is credited to factors such as innate immunity against previous bacterial and viral outbreaks, epigenetic factors, genetic polymorphisms of ACE2 receptors, and universal bacillus Calmette–Guérin vaccination among the Indian population [6]. Furthermore, during the initial phase, it was taught that the viability and transmissibility of the virus are also affected by hot and humid environmental conditions in the country [6].

Most of the patients having COVID-19 in our study were male (74.00%) which was similar to that reported by Huang *et al*. and Chen *et al*. which showed 73.0% male predominance but higher than that reported by Wang *et al*. (54.3%). This male predominance may have happened due to frequent outdoor activities such as traveling/foreign travel, occupation, education, and smoking habits of men may be the attributing factors [10]. Only 6 (1.6%) patients in our study had COPD as compared to that in Guan *et al*. [15] (1.1%). In addition, studies have shown more severe disease with higher mortality rate due to COVID-19 among men due to stronger immune response, leading to complications [11], whereas in women, cellular mosaicism in X-chromosome, estrogen hormone, and higher level of neutralizing immunoglobulin G antibodies plays the protective role against developing the infection and severity [11-13]. Our study included 427 COVID-19 affected patients with mean and median age of the study participants as 48.70 and 49 years, respectively. Median age was 7 years younger than that reported by Wang *et al*. [12] (56.0 years), Chen *et al*. [14] (55.5 years), and same to that in Huang *et al*. [13] (49.0 years). Majority (34.89%) belonged to above 60 years. Oldest patient was of 90 years and youngest 3 years old with standard deviation for age as 19.32. Most of the patients requiring oxygen support were above 60 years of age. In our study, people with comorbidities such as diabetes, cardiovascular diseases, hypertension, hypothyroidism, chronic respiratory conditions (COPD), and chronic kidney disease developed multiple symptoms requiring hospitalization and oxygen support. However, 59.48% of cases had no comorbidities, implying that the comorbidities predispose to disease severity rather than acquiring infection. The common presenting complains in the study population were dry cough (44.96%), fever (73.54%), and myalgia (49.88%) followed by the less common manifestations such as sore throat [10] (18.03%), breathlessness (28.34%), diarrhea/GI symptoms (4.92%), lethargy, and fatigue similar to the findings of most other studies [5,15,16] whereas 8.2% were asymptomatic. Although the relative transmissibility (*R*0) of the asymptomatic cases is lower than the symptomatic cases, still the identification of the asymptomatic cases is epidemiologically important. Although the relative transmissibility (R0) of the asymptomatic cases is lower than the symptomatic cases, still the identification of the asymptomatic cases are epidemiologically important as they mark the existing transmissibility of the virus in the community and serve as overt sources of infection [5]. Very few patients presented with gastrointestinal symptoms (4.92%), however,

Table 1: Basic profile of the study participants

Baseline parameters	Frequency (%)
Age category (years)	
<25	47 (11.01)
26–35	96 (22.48)
36–45	63 (14.75)
46–60	72 (16.86)
Above 60	149 (34.89)
Sex	
Female	111 (26.00)
Male	316 (74.00)
Total	427 (100.00)
Mean (SD) values	
Age (years)	48.7049 (19.3463)
Duration of symptoms	1.3068 (0.4617)
Duration of hospital stay	11.9874 (5.5564)

SD: Standard deviation

Table 2: Clinical and epidemiological parameters of COVID 19 patients

Symptoms	No (%)	Yes (%)
Fever	113 (26.46)	314 (73.54)
Cough	235 (55.04)	192 (44.96)
Breathlessness	306 (71.66)	121 (28.34)
Myalgia	214 (50.12)	213 (49.88)
GI symptoms	406 (95.08)	21 (4.92)
Sore throat (s)/anosmia (a)	350 (81.97)	77 (18.03)
Epidemiological parameters	**Frequency (%)**	
Symptoms category		
<3	365 (85.48)	
>3	62 (14.52)	
Symptoms duration (days)		
<3	296 (69.32)	
>3	131 (30.68)	
Comorbidity category		
No	254 (59.48)	
Yes	173 (40.52)	
Risk of contact		
No	367 (85.95)	
Yes	60 (14.05)	
Severity		
Asymptomatic	35 (8.20)	
Mild	250 (58.55)	
Moderate	43 (10.07)	
Severe	99 (23.19)	
HQ/HT		
HQ	36 (8.43)	
HT	391 (91.57)	
RAT		
Negative	59 (13.82)	
Not done	52 (12.18)	
Positive	316 (74.00)	
COVID test (RTPCR)		
Negative	6 (1.41)	
Not done (prior RAT done)	295 (69.09)	
Positive	126 (29.51)	
Chest X-ray		
Bilateral pneumonia	120 (28.10)	
NAD	172 (40.28)	
Not done	135 (31.62)	
Hospital stay duration (days)		
<10	205 (48.01)	
>10	222 (51.99)	
Outcome on discharge		
Death	20 (4.79)	
Discharge to home	407 (95.31)	
Total	427 (100.00)	

HQ: Home quarantine, HT: Hospital treatment, RAT: Rapid antigen test, RTPCR: Reverse transcription polymerase chain reaction

this could be an under-representation since these patients fell outside the criteria for testing. The overall mortality in our single hospital was 4.68% which was also much lower than those reported for the USA (21.1%) and UK (26%) at that time [17,18]. This favorable outcome again may be ascribed to the ability of our health-care system to adapt and ensure availability of resources. It was surprising that not many patients admitted with COVID-19 had COPD (only 1.4%), although this is consistent with those reported from the USA and China [19,20]. The overall median total duration of stay in the hospital 11.98 days (both ward and ICU) was considerably less in our patients when compared to the US (9 days in discharged and 28.5 in still admitted) and China (12 days) [17,21]. This can be attributed both to a younger population (48.2% <45 years and 65.1% <60 years old) in our study and early aggressive treatment that avoided the need for ICU admission and mechanical ventilation. In our study, hypothyroidism was present in 2.8% in total admitted patients**.** As per MV Gerwen *et al*., [22] hypothyroidism is not associated with increased risk of COVID-19 related hospitalization nor a worse outcome, including death. Hence,

Table 3: Association between outcome of discharge with various parameters

Baseline parameters	Outcome on discharge (%)			
	Death	Discharge to home	Total	p
Comorbidity category				
No	9 (3.54)	245 (96.46)	254 (100.00)	0.1765
Yes	11 (6.36)	162 (93.64)	173 (100.00)	
Total	20 (4.68)	407 (95.32)	427 (100.00)	
Age category (years)				
<25	0 (0.00)	47 (100.00)	47 (100.00)	0.0002
26–35	0 (0.00)	96 (100.00)	96 (100.00)	
36–45	0 (0.00)	63 (100.00)	63 (100.00)	
46–60	4 (5.56)	68 (94.44)	72 (100.00)	
Above 60	16 (10.74)	133 (89.26)	149 (100.00)	
Symptoms duration				
<3	14 (4.73)	282 (95.27)	296 (100.00)	0.9462
>3	6 (4.58)	125 (95.42)	131 (100.00)	
Severity				
Asymptomatic	0 (0.00)	35 (100.00)	35 (100.00)	0
Mild	0 (0.00)	250 (100.00)	250 (100.00)	
Moderate	1 (2.33)	42 (97.67)	43 (100.00)	
Severe	19 (19.19)	80 (80.81)	99 (100.00)	
Total	20 (4.68)	407 (95.32)	427 (100.00)	

for patients with hypothyroidism, no additional precautions were needed. However, susceptibility to infection might increase in patients with poorly controlled hypothyroidism [23,24].

The recovery rate of our hospital during that complete duration was 95.31%. Treatments of COVID-19 patients in our hospital were as per national clinical guidance for the management of adult COVID-19 patients [3]. Our study found lower mortality rates in patients receiving HCQ+/- azithromycin and ivermectin. However, this can be misleading as only the mild (58.5%) and moderate (9.8%) cases received these drugs. As per treatment guidelines during that time, HCQ and ivermectin were not administered in the severe cases where mortality was expected to be much higher. Thus, the lower mortality in this group is most likely due to milder disease rather than the drug itself.

The overall mortality rate of our hospital during that 6-month period was 4.69%. On analysis of the death cases, it was found that all these cases were severe cases during admission, with average age of 68.05 years, with majority having comorbid conditions and mean hospital stay being 4.65 days. All these cases were referred from other hospitals in severe conditions. In the initial phase of COVID-19 in India (April–May 2020), the use of treatment modalities such as steroids, tocilizumab, and convalescent plasma therapy was generally restricted to late stage when the condition became critical, hence, the mortality was seen much higher in these groups. Subsequent patients received these drugs much earlier in the course of the disease and have shown decrease in mortality. In our study, total pregnant females out of total females were 6.3% and they were symptomatic and asymptomatic both, but no mortality of pregnant ladies was noticed. As per Khan DSA *et al.* [24], systematic review and meta-analysis, obese, and hypertensive pregnant women with COVID-19 or those with the respiratory disorder were more likely to be symptomatic.

One of the parameters to assess the recovery from COVID-19 infection is concept of viral clearance. It depends on on lots of factors including severity of the disease and review of literature suggests on an average viral clearance to be 8–14 days with longer days among more severe cases [25]. Harpreet *et al*. [25] carried a single-center study where in their viral clearance was almost same for mild cases (11.78 days) and moderate-to-severe disease (13.05 days) with no statistical significance between them (p=0.21). We could not estimate viral clearance rate in admitted patients as we could not do RTPCR test before discharging due to various reasons including changing guidelines from time to time and

thus could not see the association between various parameters and viral clearance rate. Since the hospital discharge policy was also changing from time to time, we could not use the hospital stay as a proxy indicator to study the prognostic factors. However, we used outcome on discharge variable to see the association between various parameters, as shown in Table 3. Out of all parameters, only age category was statistically significant associated with outcome on discharge while other variables such as comorbidity, symptom duration, and severity of disease during admission did not show any statistically significant association. Kumar *et al.* [26] in their study used viral clearance rate rather than hospital stay nor hospital outcome. They showed that median time for viral clearance was increasing for 0–29 years (11 days) to above 60 years (13 days) although the association was non-significant. They also showed that both asymptomatic and symptomatic individuals had almost same viral clearance rate after adjusting for age and sex using hazard ratio analysis.

Limitations

Major limitation of the study was that it was carried out in single center and with continuously changing guidelines and novelty of virus, same standardized treatment and care protocol was not followed throughout the 6-month study period. No follow-up was done post-discharge to check for any post-COVID illness, signs or recurrence of disease in these patients, and effects on pregnant lady and baby. Viral clearance rate was not able to calculate, since testing protocol before discharge was not followed throughout, with changing guidelines.

CONCLUSION

Due to novelty of the virus and changing guidelines and lack of research during the initial days, this single-center study provided the spectrum of clinical presentations and host-related factors in outcome of COVID-19 during the first wave which may help in decrease the burden of disease, minimize social disruption, and reduce the economic impact associated with a pandemic. Early detection, admission, and treatment of individuals with comorbidities and elderly would increase the recovery from the disease, thereby reduce mortality.

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AUTHORS' CONTRIBUTIONS

All authors have contributed to the preparation of manuscript.

CONFLICTS OF INTEREST

Nil.

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