Demographic Characteristics of 1082 Positive Cases of COVID-19 Patients: Experience at National Referral Laboratory of Bangladesh

Arifa Akram[1], Mahmuda Yeasmin[2], THM Enayet Ullah Khan[3], Mohammad Abdullah Az Zubayer Khan[4], Md. Bayzid Bin Monir[5], Mst. Naznin Tarana[6], Sunzida Arina[7], Md. Maruf Ahmed Molla[8], Tasnim Nafisa[9], Md. Abdullah Yusuf[10], Shaikh Badiuzzaman[11], Md. Khan Zahan Ali[12], Abu Ahammad Al Mamun[13], AKM Shamsuzzaman[14]

[1]Assistant Professor, Department of Virology, National Institute of Laboratory Medicine and Referral Center, Dhaka, Bangladesh; [2]Medical Officer, Department of Virology, National Institute of Laboratory Medicine & Referral Centre, Dhaka, Bangladesh; [3]Dental Surgeon, Data Assistant, MIS, attached to National Institute of Laboratory Medicine & Referral Centre, Dhaka, Bangladesh; [4]Assistant Professor, Department of Hematology, National Institute of Laboratory Medicine & Referral Centre, Dhaka, Bangladesh; [5]RMO, National Institute of Laboratory Medicine & Referral Centre, Dhaka, Bangladesh; [6]Assistant Professor, Department of Microbiology, National Institute of Laboratory Medicine & Referral Centre, Dhaka, Bangladesh; [7]Assistant Professor, Department of Microbiology, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; ; [8]Medical Officer, Department of Virology, National Institute of Laboratory Medicine & Referral Centre, Dhaka, Bangladesh; [9]Medical Officer, Department of Virology, National Institute of Laboratory Medicine & Referral Centre, Dhaka, Bangladesh; [10]Associate Professor, Department of Microbiology, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [11]Assistant Professor, Department of Clinical Pathology, National Institute of Laboratory Medicine & Referral Centre, Dhaka, Bangladesh; [12]Medical Technologist, National Institute of Laboratory Medicine and Referral Center, Dhaka, Bangladesh; [13]Assistant Director, National Institute of Laboratory Medicine and Referral Center, Dhaka, Bangladesh; [14]Director & Professor of Microbiology, National Institute of Laboratory Medicine and Referral Center, Dhaka, Bangladesh

Abstract

Background: COVID-19 has now become a pandemic. **Objective:** The aim of this study was to characterize the demographic features with infection rate of SARS-CoV-2 in 4/5 divisions of Bangladesh. **Methodology:** This cross-sectional study was conducted at National institute of Laboratory Medicine and Referral Center, Dhaka, Bangladesh from 15th April to 30th April, 2020. It was performed RT-PCR for 2462 cases within the time frame and 1082 samples were positive for SARS CoV-2. Patient demographic characteristics including age, gender, occupation and blood group was investigated. **Results:** The mean age of positive cases was 40.2 ± 15.33 years, 426 (39%) cases were 25-39 years of age. The majority of cases were male (71%) and the predominant blood group was B positive (37%). **Conclusions:** In conclusion male gender, younger age and blood group B positive are more commonly suffering from COVID-19 infection. [*Bangladesh Journal of Infectious Diseases, October 2020;7(suppl_2):S22-S26*]

Keywords: COVID-19; SARS-COV-2; Demographic features; Blood group; B positive

Introduction

In late December 2019, several cases of pneumonia with an unknown cause were reported in Wuhan, China, and later in January 2020, Chinese center for disease control and prevention (CDC) identified a new type of coronavirus from those pneumonia cases[1]. The World Health Organization (WHO) chose the official name of COVID-19 (stand for coronavirus disease 2019), for the disease, as well as the term SARS−COV-2 (severe acute respiratory syndrome coronavirus 2) for the virus[2]. WHO announced COVID-19 as a pandemic in March 11, 2020 after it had spread to more than 100 countries and resulted in tens of thousands of cases within a few months[3].

SARS-CoV-2 is a member of the Corona viridae family that consists of a single-stranded positive-sense RNA, named for the crown like spikes on its surface[4]. So far, two human infections by viruses related to Corona viridae family are known: Severe Acute Respiratory Syndrome (SARS), caused by SARS-CoV, which emerged in China in 2002 and spread across 37 countries, and the Middle-East Respiratory Syndrome (MERS), caused by MERS-CoV, which was first seen in Saudi Arabia in 2012. SARS-COV-2 is genetically related to SARS-CoV with both of them being beta-corona viruses[4-5].

Bangladesh faces significant challenges in combating COVID-19 as it is a densely populated country and also houses a million stateless Rohingya refugees in sprawling refugee camps that are conducive to the spread of epidemics. It also has significant migrant populations living in Italy, a COVID-affected country[6,7]. In Bangladesh, however, the first case was reported on March 8, 2020[8-9]. Government issued a lock down condition ordering all public and private offices to be closed, with the exception for emergency services. People have been asked to practice social distancing and stay at home. Public transport was limited and advice was given to avoid them. This lockdown was extended several times which was started from 23rd March until officially ceasing on 30 May 2020 to limit the spreading of this novel corona virus infection throughout the country[10,11]. In spite of taking necessary strategies to control this pandemic the novel coronavirus has already been spread to all 64 districts of Bangladesh.

Bangladesh is the second most affected country in South Asia, after India[12]. More than 70% of the 10,143 coronavirus cases detected in Bangladesh have been reported in the Dhaka division and nearly half of them are in the capital, Dhaka[13]. By the time of writing in August 2020, daily thousands of new cases are being reported in Bangladesh affecting almost every corner of the country but information regarding socio-demographic characteristics of COVID-19 affected population is very limited. When an outbreak such as this occurs, organized demographic data and knowledge are equally essential to continue the evaluation required to identify the threats and take needful strategies for containment.

The aim of the study was to characterize the demographic features with infection rate of SARS-CoV-2 in 4/5 divisions of Bangladesh in order to better understand the epidemic of novel corona virus and provide the basis for the future development of control measures and to identify the distribution patterns of Covid-19 and blood group among the positive cases of Bangladesh. This study will also reveal the pattern of Covid-19 in Bangladesh in the world literature.

Methodology

Samples come from all division of Bangladesh in National institute of laboratory medicine and referral center, Dhaka and around 1000 samples were tested for real time PCR for SARS CoV-2 almost every day. A cross sectional study was conducted from 15th April to 30th April, 2020. Among 2462 cases with mild or moderate symptoms 1082 cases were confirmed as true Covid-19 cases by RT-PCR assay of nasal and oral swabs. The study was approved by the NILMRC Ethics Committee. Throat and nasal swab specimens from the upper respiratory tract were collected in viral transport medium in the respective hospitals or institute and then transported to our lab with precaution. Here we performed RT-PCR by Sansure Biotech Novel Coronavirus (2019-nCoV) Nucleic Acid Diagnostic Kit. The Director General Health Service of Bangladesh provided the RT-PCR reagents. First step was RNA extraction with release reagent provided along with PCR kit. After that 20 μL of the processed specimens were mixed with 30 μL master mix for subsequent real time RT-PCR targeting SARS-CoV-2 ORF and N gene as described in kit manual. SPSS software, version 19 (SPSS Inc., Chicago, IL, USA) was used to analyze the data. Categorical variables were summarized as frequencies and percentages. Reported p-values of <0.05 were considered statistically significant. The analyses were based on non-missing data, and missing data were not imputed. The age and sex distribution were examined and relevant charts were drawn. Sex ratio (male to female) was calculated.

Results

A total of 2462 patients were included in this study, among whom 1082 patients (44.0%) cases were identified as laboratory confirmed COVID-19 cases (Figure I).
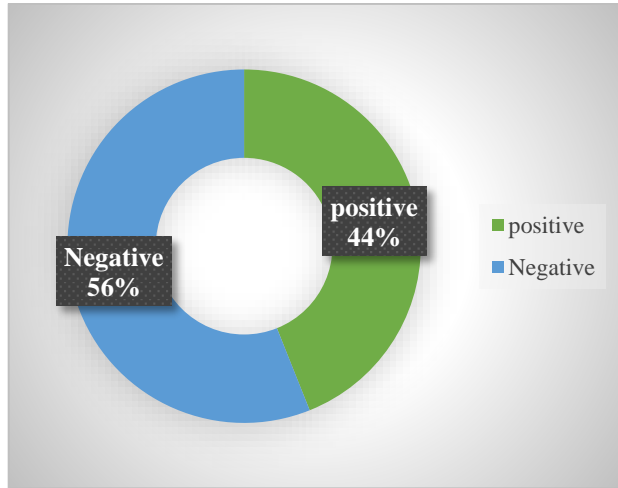

Figure I: Positive and Negative Covid-19 Cases

Out of 1082 positive cases 763 cases were male patients (71.0%) and 264 cases were female patients (29.0%) (Figure I, Table 1). Among the 1082 positive cases, the mean of age was 40.2 ± 15.33 years and the median of age was 38 years. The predominant age group was 25 to 39 years followed by 40 to 59 years (Figure II). The occupations of patients were diverse. Civil servants were accounted for 36.0% (400/1082) (Table I).

**Table 1: Demographics Characteristic of positive cases (N=1082)**

Characteristics	Frequency	Percent
Gender		
• Male	763	71.0
• Female	219	29.0
Occupation		
• Civil Servant	400	36.96
• Teacher	50	4.62
• Retired	75	6.93
• Farmer	47	4.34
• Self-employed	150	13.86
• Student	200	18.48
• Private company	128	11.82
• Unknown	32	2.95
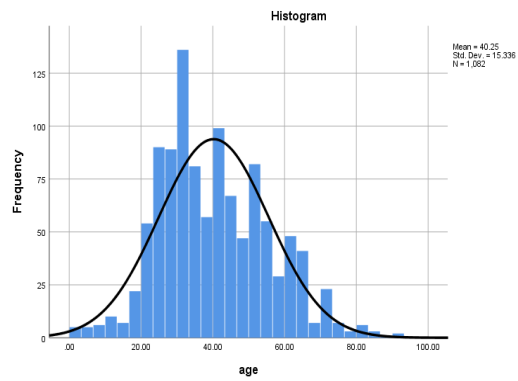
Figure II: Histogram showing the frequency of the Covid-19 infections in different age groups.
Mean age±SD=40.2 (±15.33) years

Most of the patients were from Dhaka city (575), whereas 480 case were from Sylhet followed by Chattogram, Rajshahi, Rangpur and Khulna division respectively (Figure III).
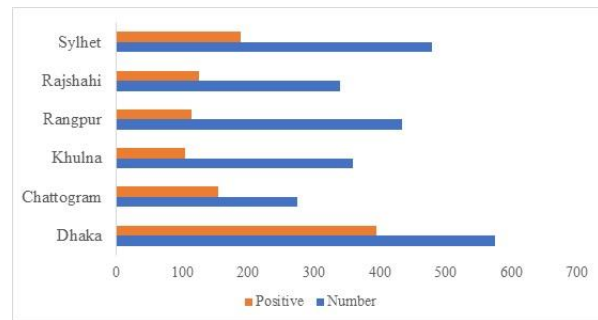
Figure III: Distribution of Total Cases and Positive Cases in Different Division of Bangladesh

A total number of 400 PCR positive patients with blood group information was in the system. The blood group distribution of 400 patients was A, B, O, AB was 21.0%, 37.0%, 25.0% and 11.0% respectively. Rh (+) was 94.5% and Rh (–) 5.5% cases (Table 2).

Table 2: Blood Group Distribution and Analysis of 400 Covid-19 Diagnosed Patients

Blood Group	Frequency	Percentage (%)
A Positive	85	21.0
A Negative	4	1.0
B Positive	148	37.0
B Negative	5	1.5
O Positive	100	25.0
O Negative	8	2.0
AB Positive	45	`11.0

AB Negative	5	1.5
Rh+	378	94.5
Rh -	22	5.5

Discussion

The 21st century started with the emergence of SARS-CoV-2 which has caused an outbreak of unusual viral pneumonia in patients in Wuhan, China. Later, it became a significant threat to global health[14-15]. The symptoms of COVID-19 are almost similar to other respiratory viruses, which includes fever, cough, fatigue, diarrhea, and vomiting, with radiographs showing invasive lesions in the lung. Some of these patients presented with serious complications such as acute respiratory distress syndrome or shock[16].

According to our data, the mean (SD) age of Bangladeshi Covid-19 patients is 40.2 (15.33) years, which is in agreement with Guan et al[17] who reported a median age (IQR) of 47.0 (35.0 to 58.0) years where 55.1% of their cases were between 15 to 49 years old. Although in this study the most frequent Covid-19 infection occurred in the 25 to 39 and 40 to 60 years age groups. The high frequency of Covid-19 infection in these age groups may be due to low median age (38 years) of the Bangladeshi population which is in line with study of India[18]. 28% of case found in Italy, 32% in France, 47% in Canada, 55% in Japan and 58% in South Korea in 0 to 50 years age group[19] and presentation is also similar in Bangladesh.

About 71% of our cases were males while it only (49.3% to 54.3%) in China[20]. However, our finding was in line with the reports of Italy (60%)[21], and the United States (63%)[22]. As most of the people were in working age group, we found 36% people are Civil servants comparing with other occupations.

The relationship between ABO blood group and the incidence of coronavirus disease 2019 (COVID-19) infection has been investigated in several studies. In SARS-CoV-2 positive cases of us, there is a high proportion of blood group B. This finding is consistent with similar study of Saudi Arabia[24]. However, some studies found that blood group A was associated with a higher risk for acquiring COVID-19 whereas blood group O was associated with a lower risk for the infection[25-28]. However, actually in Bangladesh majority (39.8%) were identified as having blood group B while 27.6% were blood group O; 23.5% and 9.2% were blood group A and AB respectively. Rh-D positive were 97.4% and Rh-D negative were 2.6%[29]. There is an almost equal predominance of both O (37.0%) and B group in India (32.0%) and neighboring countries such as Bangladesh (31.0% and 33.0%) and Pakistan (30.0% and 40.0%), in contrast to dominance of O and A groups in the European and African populations[30]. This is the first observation of an association between the ABO blood type and COVID-19 in Bangladesh. But it should encourage further investigation of the relationship between the ABO blood group and the COVID-19 mortality.

This is the first study to address the characteristics of Covid-19 patients confirmed by RT-PCR in Bangladesh. The duration of the study was relatively short (15th April to 30th April, 2020), studying a sudden outbreak of an infectious disease, of which 2462 cases during this period were examined which came to our institute for RT PCR. The spread of the pandemic to various geographic locations, age groups and comorbid patients may behave differently and hence these results may be difficult to generalize at national or international level. We cannot analyze the co morbidity and mortality status as we did not have these data.

Conclusion

COVID-19 has not yet ended and it's the major limitation. So far, the Bangladesh government has been fighting the coronavirus with its limited capacity and resources. The frequency of Covid-19 infection is higher in age group of 25-39 years, but there were a higher number of fatalities in younger patients in international studies. As we did not have clinical and others data, so we could not compare the clinical features or mortality among age groups. The results of this study emphasize the significant effect of younger age, male gender and B positive blood group among COVID-19 patients. As COVID-19 is considered a global health threat, it still needs to be investigated deeply.

References

1. Nikpouraghdam M, Farahani AJ, Alishiri G, Heydari S, Ebrahimnia M, Samadinia H, Sepandi M, Jafari NJ, Izadi M, Qazvini A, Dorostkar R. Epidemiological characteristics of coronavirus disease 2019 (COVID-19) patients in IRAN: A single center study. Journal of Clinical Virology. 2020 Apr 21. Main

2. World Health Organization 2020a. Naming the coronavirus disease (COVID-19) and the virus that causes it. Accessed on: 3rd July,2020.

3. Coronavirus outbreak officially declared a pandemic, WHO says. By Rachael Rettner; https://www.livescience.com/coronavirus-pandemic-who.html

4. Goshayeshi L, Rad MA, Bergquist R, Allahyari A, Hoseini B, MUMS Covid-19 Research Team. Demographic and Clinical Characteristics of the Severe Covid-19 Infections: First Report from Mashhad University of Medical Sciences, Iran. medRxiv. 2020 Jan 1. 2020.5.20

5. Yeasmin M, Tasnim J, Akram A, Yusuf MA, Shamsuzzaman AKM, Molla MMA, Ghosh AK. Routes of Transmission of Newly Emerging SARS-CoV-2: A Systematic Review. Bangladesh J Infect Dis 2020;7(suppl_1):S18-S31

6. Irfan Nooruddin, Rudabeh Shahid, Defusing Bangladesh's COVID-19 time bomb Archived 28 July 2020 at the Wayback Machine, Atlantic Council, 30 March 2020.

7. 10 ICU beds for 1.2 million: COVID-19 catastrophe looms in Cox's Bazar Archived 28 July 2020 at the Wayback Machine, Reliefweb, 16 April 2020. Accessed on: 23rd July, 2020.

8. Bangladesh: First cases of COVID 19 confirmed March 8. Available at: https://www.garda.com/crisis24/news-alerts/320606/bangladesh-first-cases-of-covid-19-confirmed-march-8, Accessed on: 23rd August, 2020.

9. Bangladesh confirms first case of corona virus. Available at: https://www.aa.com.tr/en/asia-pacific/bangladesh-confirms-first-case-of-coronavirus-/1758924. Accessed on: 13th July,2020.

10. Coronavirus outbreak: Govt orders closure of public, private offices from March 26 to April 4 Archived 30 July 2020 at the Wayback Machine, The Daily Star, 23 March 2020. Accessed on: 20th July,2020.

11. "Govt decides not to extend general holidays further". The Business Standard. 27 May 2020. Archived from the original on 26 August 2020. Retrieved 14 August 2020. Accessed on: 13th July,2020.

12. Research (IEDCR), Institute of Epidemiology, Disease Control and. করোনা ইনফো. corona.gov.bd (in Bengali). *Archived* from the original on 22 March 2020. *Retrieved 3 May 2020*. Accessed on: 17th July,2020.

13. TBS Report. Dhaka city, 4 districts home to 73% Covid-19 cases. The Business Standard, 22 April, 2020. Accessed on: 18th July,2020.

14. Biscayart C, Angeleri P, Lloveras S, Chaves TD, Schlagenhauf P, Rodríguez-Morales AJ. The next big threat to global health? 2019 novel coronavirus (2019-nCoV): What advice can we give to travelers?–Interim recommendations January 2020, from the Latin-American society for Travel Medicine (SLAMVI). Travel medicine and infectious disease. 2020; 33: 101567.

15. World Health Organization 2020b. WHO Novel coronavirus-China. Jan 12, 2020. Available at: http://www.who.int/csr/don/12-january-2020-novel-coronavirus-china/en/ Accessed on: 17th July, 2020.

16. Zhang X, Cai H, Hu J, Lian J, Gu J, Zhang S, Ye C, Lu Y, Jin C, Yu G, Jia H. Epidemiological, clinical characteristics of cases of SARS-CoV-2 infection with abnormal imaging findings. International Journal of Infectious Diseases. 2020 Mar 20.

17. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, Liu L, Shan H, Lei CL, Hui DS, Du B. Clinical characteristics of coronavirus disease 2019 in China. New England journal of medicine. 2020; 382(18):1708-20.

18. 54% Covid-19 cases in 18-44 age group, 51% deaths among those over 60 years: Health ministry. Available at: https://timesofindia.indiatimes.com/india/54-covid-19-cases-in-18-44-age-group-51-deaths-among-those-over-60-years-health-ministry/articleshow/77883146.cms Accessed on: 13th September, 2020.

19. 68% of Covid 19 patients age 50 or below. Available at: https://tbsnews.net/coronavirus-chronicle/covid-19-bangladesh/68-covid-19-patients-age-50-or-below-72247. Accessed on: 23rd August, 2020.

20. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, Wang B, Xiang H, Cheng Z, Xiong Y, Zhao Y. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. Jama. 2020; 323(11):1061-9.

21. Grasselli G, Zangrillo A, Zanella A, Antonelli M, Cabrini L, Castelli A, Cereda D, Coluccello A, Foti G, Fumagalli R, Iotti G. Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy Region, Italy. Jama. 2020;323(16):1574-81.

22. Bhatraju PK, Ghassemieh BJ, Nichols M, Kim R, Jerome KR, Nalla AK, Greninger AL, Pipavath S, Wurfel MM, Evans L, Kritek PA. Covid-19 in critically ill patients in the Seattle region—case series. New England Journal of Medicine. 2020; 382(21):2012-22.

23. Zietz M, Tatonetti NP. Testing the association between blood type and COVID-19 infection, intubation, and death. MedRxiv. 2020 Jan 1.

24. Aljanobi GA, Alhajjaj AH, Alkhabbaz FL, Al-Jishi JM. The Relationship between ABO Blood Group Type and the COVID-19 Susceptibility in Qatif Central Hospital, Eastern Province, Saudi Arabia: A Retrospective Cohort Study. Open Journal of Internal Medicine. 2020; 10(2):232-8.

25. Zhao J, Yang Y, Huang HP, Li D, Gu DF, Lu XF, Zhang Z, Liu L, Liu T, Liu YK, He YJ. Relationship between the ABO Blood Group and the COVID-19 Susceptibility. medRxiv. 2020 Jan 1.

26. Esref AR, Solmaz I, Akkoc H, Donmezdil S, Karahan Z, Safak KA, MERTSOY Y, Yildirim MS, Nazim EK, Songul AR, Demir C. Association between the Rh blood group and the Covid-19 susceptibility. International Journal of Hematology and Oncology. 2020; 30(2):081-6.

27. O'Sullivan JM, Ward S, Fogarty H, O'Donnell JS. More on "Association between ABO blood groups and risk of SARS-CoV-2 Pneumonia". British Journal of Haematology. 2020 May 18.

28. Wu Y, Feng Z, Li P, Yu Q. Relationship between ABO blood group distribution and clinical characteristics in patients with COVID-19. Clinica Chimica Acta. 2020;509: 220-3.

29. Sultana R, Rahman Z, HELALI A, Yousuf R, Mustafa S, Salam A, Haque M. Study Of ABO and Rh-D blood groups among the common people of capital city of Bangladesh. International Journal of Pharmacy and Pharmaceutical Sciences. 2013;5(3):814-6

30. Agrawal A, Tiwari AK, Mehta N, et al. ABO and Rh (D) group distribution and gene frequency; the first multi centric study in India. Asian J Transfus Sci 2014; 8(2):121-125