Research Article

Clinico-Epidemiological Scenario, Laboratory Evaluation and Admitted Geriatric COVID-19 Patients in Bangladesh

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Abstract

Introduction: Coronavirus disease (Covid-19) is an infectious disease caused by the SARS-CoV-2 virus. Covid-19 can be austere and has caused billions of demise. Covid-19 causes higher mortality proportions in elderly patients along with other health complications such as cardiovascular disease, chronic respiratory system diseases, hypertension, diabetes and malignant diseases

Aim of the study: The study aimed to identify the clinico-epidemiological scenario, laboratory evaluation, and outcome of admitted geriatric Covid-19 patients in Bangladesh

Methods: The study was conducted in three dedicated COVID-19 treatment centres in Dhaka city throughout July in the year 2021. Three facilities were Dhaka Medical College Hospital-2 (DMCH-2, COVID-19 dedicated 600 beds), Dhaka North City Corporation Hospital (DNCC, COVID-19 dedicated 750 beds), and Kuwait Moitry Hospital (COVID-19 dedicated 240 beds). A total of three forty-five (N=345) geriatric patients fulfilling the inclusion criteria were enrolled in the study. Verbal consent was attained from every subject or guardian of the patient. The data analysis was performed using Statistical Package for the Social Sciences (SPSS) Version 25.0.

Result: The majority of the present study participants (84.06%) were between the age group of 61-70 years, while 13.04% were between the age of 71-80 years A little higher female prevalence was observed. For the diagnosis of COVID, RT-PCR was used for 87.83% of the participants, 7.25% had been diagnosed via RAT, and 4.93% were suspected COVID cases. Among the presenting complications of the participants, the cough had the highest prevalence at 88.99%. Among the 345 patients, 40% had abnormal oxygen saturation levels, 89% had abnormal WBC counts, 66.1% had abnormal neutrophil counts, 82.9% had abnormal lymphocyte counts, 6.1% had hypoglycemia, 25.2% had hyperglycemia, 29.0% had abnormal creatinine levels, 13.3% had abnormal SGPT levels, and 4.3% had abnormal serum D-Dimer levels. Serum ferritin level was abnormal in 89.3% of the male population and 80.10% of the female population.

Conclusion: Initial detection of SARS-CoV-2 infected individuals is vital to contain the extent of the Covid-19 pandemic and efficiently allocate medical resources. Elderly patients with COVID-19 need more medical maintenance. Approaches should be needed for sensible use of hospital assets during the pandemic surge to alleviate the number of death.

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Introduction

The SARS CoV-2 infection is a great concern worldwide as millions of people are dying especially senior citizens. [1] The geriatric population is defined as the population aged 60 years and above. Geriatric people can be further divided into three subgroups. People aged 60 to 69 years are the young old, 70 to 79 years are the old and the oldest old are 80 years or more in age. [2] Moreover, COVID-19 is changing the daily routine of elderly people. Bangladesh is no exception. Over the past two decades, the geriatric population of Bangladesh is increasing which is 71 and 74 years respectively for males and females. [3] Bangladesh is a densely populated country with 162 million people making it the 8th largest populated country in the world. But the fact is that most of the elderly people of this country suffer from some basic human problems, like lack of health facilities, poor nutritional support, financial constraints due to dependence on others, multiple co-morbidities, social isolation, negligence, and socio-economic insecurity. [4] So the geriatric population has been suffering most from severe COVID-19 illness and comprises the major bulk of the death toll. Another important cause of developing severe and critical COVID-19 illnesses is the lack of vaccination. Though the vaccination was started in Bangladesh on 26th January 2021; the speed has become much slower due to the unavailability of the Corona vaccine. Despite the great effort, Bangladesh could not manage enough vaccines to protect the huge population. Though the geriatric population has got the priority to get the vaccine, up to 24th June 2021, the number of people who received at least 1 dose of COVID-19 vaccine is 5,823,245 which is 3.6% of the total population. The number of fully vaccinated people is 4,272,334 9 2.6% of the total population) [5]. So lack of vaccination has become another important cause of COVID-19-related morbidity and mortality in Bangladesh. Perhaps, physiological changes of maturing diminished safe capacity invulnerable capacity and multi-morbidity expanded the hazard of geriatric patients from COVID-19. This made them more vulnerable to COVID-19 infection [6]. Several studies have revealed that the older population could be very frail due to their comorbidities and age-related physiologic changes. [7-10] Covid-19 causes higher mortality rates in geriatric patients along with other health problems such as cardiovascular disease, chronic respiratory system diseases, hypertension, diabetes and malignant diseases [11]. Compared to people in a younger age group, the symptoms and course of the disease in the older population might also differ. Eubank et. al. (2020) found that COVID-19 symptoms appeared at the age of 70 years are 20 times more likely to be hospitalized than those at age of 20 years [12]. The aim of the study is planned to evaluate the clinico-epidemiological scenario, the laboratory evaluation, and the outcome of admitted geriatric COVID-19 cases in Bangladesh.

Methods

The study was carried out in three dedicated COVID-19 treatment centres in Dhaka city throughout July in the year 2021. Three facilities were Dhaka Medical College Hospital-2 (DMCH-2, COVID-19 dedicated 600 beds), Dhaka North City Corporation Hospital (DNCC, COVID-19 dedicated 750 beds), and Kuwait Moitry Hospital (COVID-19 dedicated 240 beds). A total of three forty-five (N=345) geriatric patients fulfilling the inclusion criteria from all three mentioned hospitals were admitted with features of COVID-19 infection and RT-PCR for SARS- CoV-2 positive included in the study. The purposive sampling technique was used in the selection of the study population. All clinical features, detailed addresses, physical examination findings, oxygen saturation, vaccination status, smoking history, alcohol consumption history and history of comorbidities were recorded in the case record form. Patients were subjected to a detailed clinical evaluation. The outcome of each patient was noted carefully. Verbal informed consent was obtained from every subject or guardian of the patient. Each subject or guardian was informed of the aims, methods, anticipated benefits and potential hazards of the study. The patient or guardian had an exemption to refrain from participation in the study or be free to withdraw from the study. A pre-tested questionnaire was used. The principal investigator frequently checked all the recorded data. The data were kept confidential and were only used for the study purpose.

Inclusion Criteria

- All geriatric (60 years or above) patients admitted to the study site with COVID-19 infection who were RT-PCR positive.

- Patients who had given consent to participate in the study.

Exclusion Criteria

- Suspected COVID-19 patients aged 60 years or more who are RT-PCR negative.

- COVID-19 infected cases aged less than 40 years.

- Exclude those affected with other chronic diseases etc.

COVID-19 confirmed case:

A person with laboratory confirmation of COVID-19 infection with or without clinical signs or symptoms (fever and at least one sign or symptom of respiratory disease e.g. cough, shortness of breath, etc. [13-15]

Admission criteria of COVID-19: [16-18]

All suspected or confirmed cases of COVID-19 presenting as-

- Moderate case: clinical or radiological evidence of pneumonia

- Severe Pneumonia: clinical or radiological evidence of Pneumonia with signs of severe pneumonia (respiratory rate > 30 breaths/minute) or oxygen saturation <90%.

- Critical COVID-19: The presence of-

  - ARDS

  - Sepsis

  - Septic shock

- Hypoxia (SpO2 ≤93% even in the absence of any clinical sign.

- Patient with multiple uncontrolled co-morbidities or prothrombotic states irrespective of severity.

Data analysis

The study coordinators performed random checks to verify data collection processes. Completed data forms were reviewed, edited, and processed for computer data entry. Frequencies, percentages, and cross-tabulations were used for descriptive analysis. $\chi 2$ test was used to analyze statistical significance. The data analysis was performed using Statistical Package for the Social Sciences (SPSS) Version 25.0. The significance level of 0.05 was considered for all tests.

Results

It was observed that the majority of the present study participants (84.06%) were between the age group of 61-70 years, while 13.04% were between the age of 71-80 years, and 10 participants were over 80 years of age. The mean age of the participants was 66.95 years, with ages ranging from 61 years to 95 years. A slightly higher female prevalence was observed among the study participants, with a male: female ratio of 1:1.04. over half the participants (58.84%) were housewives, while 30.43% were unemployed and only 10.72% were employed. For the diagnosis of COVID, RT-PCR was used for 87.83% of the participants, 7.25% had been diagnosed via RAT, and 4.93% were suspected COVID cases. 19.71% of the participants had a smoking habit, while 0.29% were alcohol consumers. Only 27 patients (7.83%) were fully vaccinated (2 doses) (Table 1). Among the presenting complications of the participants, cough had the highest prevalence at 88.99%. Some other complications with high prevalence were Dyspnea (66.96%), Fatigue (44.64%), high systolic BP (42.03%), High diastolic BP (33.04%) and fever (39.42%). Other complications were also observed in smaller frequencies. The mean values of systolic and diastolic BP were 121.49 mmHg and 74.63 mmHg respectively. The mean pulse of the participants was 123.90 bpm, while the mean temperature was 102.24º F (Table 2). The lab findings of all the participants were divided into abnormal findings and normal findings. Among the 345 patients, 40% had abnormal oxygen saturation levels, 89% had abnormal WBC counts, 66.1% had abnormal neutrophil counts, 82.9% had abnormal lymphocyte counts, 6.1% had hypoglycemia, 25.2% had hyperglycemia, 29.0% had abnormal creatinine levels, 13.3% had abnormal SGPT levels, and 4.3% had abnormal serum D-Dimer levels. Serum ferritin, ESR, Hemoglobin and platelet counts had different values for abnormal findings compared to gender. According to haemoglobin levels, 30.2% of the male population and 63.1% of the female population had abnormal findings. In regards to platelet counts, only 3.0% of males and 1.7% of females had abnormal platelet counts. ESR was abnormal in the majority of patients, 98.8% among the male population and 96.0% among the female population. Serum ferritin level was abnormal in 89.3% of the male population and 80.10% of the female population (Table 3).

Table 1: Social-demographic characteristics of the participants (N=345)

Social Characteristics	Frequency	Percentage
Age Group		
61-70	290	84.06%
71-80	45	13.04%
>80	10	2.89%
Mean Age	66.95 ± 6.89 years	
Minimum Age	61 years	
Maximum Age	95 years	
Gender		
Male	169	48.99%
Female	176	51.01%
Occupation		
Unemployed	325	94.20%
employed	20	5.80%
Covid-19 Diagnosis		
RT-PCR	303	87.83%
Rapid Antigen Test (RAT)	25	7.25%
COVID suspected case	17	4.93%
Behavioral Risk Factors		
Smoking	68	19.71%
Alcohol	1	0.29%
Vaccination Status		
Vaccinated	27	7.83%
Not Vaccinated	318	92.17%

Table 2: Distribution of the participants by presenting clinical features (N=345).

Clinical Features	N	%
Cough	307	88.99%
Diarrhoea	51	14.78%
Anorexia	67	19.42%
Nausea and Vomiting	78	22.61%
Loss of Smell	22	6.38%
Dyspnea	231	66.96%
Headache	55	15.94%

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Myalgia	69	20.00%
Sore Throat	37	10.72%
Fatigue	154	44.64%
Fever	136	39.42%
Systolic BP		
Mean	121.49 mmHg ± SD	
Minimum	60 mmHg	
Maximum	195 mmHg	
Diastolic BP		
Mean	74.63 mmHg ±SD	
Minimum	40 mmHg	
Maximum	110 mmHg	
Pulse		
Mean Pulse	123.90 bpm ± SD	
Minimum	42 bpm	
Maximum	113 bpm	
Temperature		
Mean Temperature	102.24º F ± SD	
Minimum	100º F	
Maximum	104º F	

Table 3: Laboratory Findings of the participants (N=345).

Lab Findings	Abnormal Findings (N,%)	Mean values
Oxygen Saturation	138 (40.0)	88.26
Hemoglobin (mg/dl)		
Male (n=169)	51 (30.2)	12.85
Female (n=176)	111 (63.1)	
WBC count (×10^9/L)	307 (89.0)	
Neutrophil Count (x10^9/L)	228 (66.1)	
Lymphocyte count (x10^9/L)	286 (82.9)	
Platelet count		
Male (n=169)	5 (3.0)	
Female (n=176)	3 (1.7)	
ESR (mm/Hg)		
Male(n=169)	167 (98.8)	51.15
Female(n=176)	169 (96.0)	
CRP (mg/L)	35 (10.1)	50.38
RBS (mmol/L)		
Hypoglycemia	21 (6.1)	14.05
Hyperglycemia	87 (25.2)	
S. Creatinine (µmol/L)	100 (29.0)	12.9
SGPT (units/L)	46 (13.3)	108.42
S. Ferritin (ng/mL)		
Male (n=169)	151 (89.3)	614.58
Female (n=176)	141 (80.1)	
D-Dimer (µg/mL)	15 (4.3)	165.27

Discussion

Early detection of clinical features along with important investigation findings may reduce the mortality and morbidity of the COVID-19-infected geriatric population. This is true for any country around the world. But while some countries have special care systems for the elderly, there are no such facilities in countries like ours, excluding elder homes. As such, the majority of our country's elderly population either stay home alone or with their children. Despite the care provided by the family members, due to lack of specialized care, the elderly population still suffer more from various diseases, which has been painfully apparent during the recent COVID crisis. Among the present study participants, the majority were from the age groups of 61-70 years. This was understandable, as the study was conducted with geriatric patients. It was also observed that very few participants were over 70 years of age, with 73.04% of the study participants being from the age group of 71-80 years, and 2.89% being over 80 years of age. This might be due to the average lifespan being <73 years in Bangladesh [19]. Male female prevalence was almost similar among the participants, with a slightly higher female prevalence (51.01%). Due to the older age of the participants, the majority were unemployed, with only 5.80% still employed. The participants were selected for this study after showing Covid-19 symptoms. Among the 345 participants, RT-PCR was used for diagnosis of Covid in 87.83% of the participants, 7.25% had been diagnosed via RAT, and 4.93% were Covid suspected cases who were later diagnosed clinically. The Vaccination rate was extremely low among the participants, with only 7.83% being vaccinated. However, this was understandable, as the vaccination had started in our country in January of 2021, prioritizing the health care employees and essential workers, while public vaccination started on 7th February 2021, and this study was conducted on July 2021 [20]. Habitual risk factors like smoking were present in 19.71%, while alcohol consumption was observed in only 0.29% of the population. Among the prevalent clinical features, cough and dyspnea had the highest prevalence at 88.99% and 66.96% respectively. Other prevalent features were fatigue, fever, nausea and vomiting. The mean values of systolic and diastolic BP were 121.49 mmHg and 74.63 mmHg respectively. The mean pulse of the participants was 123.90 bpm, while the mean temperature was 102.24º F. Among the laboratory findings of the patients, abnormal findings were presented through a table. According to the findings, white blood cell counts and lymphocyte counts were abnormal for over 80% of the participants.

Elderly people with underlying diseases including hypertension, cardiovascular disease and diabetes are more susceptible to COVID-19 [21,22]. It might be a consequence of changes in the anatomy of elderly lungs and muscle atrophy results in alteration of lung function. Moreover, people in this age group are more liable to multi-system organ dysfunction

[21]. That might reflect in the different laboratory outcomes. Prompt diagnosis of COVID-19 in the older age group is essential since elderly people with comorbidities are more susceptible to severe illness and the mortality rate is also higher as well [21,23]. Liu et. al. (2020) exemplified that lymphopenia in elderly COVID-19 confirmed patients was remarkably higher than that of the younger age group [21]. Liu K, Chen Y, Lin R, Han K. Clinical features of COVID-19 in elderly patients: A comparison with young and middle-aged patients. Journal of Infection. 2020 Jun 1;80(6):e14-8. Chan et. al. (2019) found that lymphopenia, low platelet counts and higher CRP were observed in the elderly study population [24]. Thus, lymphopenia, elevated CRP and LDH are tests that should be considered more particularly in elderly COVID-19 patients [25-27]. Patients with comorbidities have more decay outcomes compared with patients without. Several studies found the worst prognosis and most often end up with deteriorating outcomes such as acute respiratory distress syndromes (ARDS) and pneumonia. COVID-19 patients with a history of hypertension (HTN), obesity, chronic lung diseases, diabetes (DM), hyperlipidemia, cardiovascular diseases (CVD), coronary artery diseases, renal diseases and malignancy increase the risk of death among COVID-19 elderly patients [28-30]. Patients with comorbidities should take all necessary precautions to avoid getting infected with the coronavirus as they are harbouring the worst prognosis. These precautions include regular handwashing with soap or using alcohol-made hand sanitiser, maintaining and practising social distancing and wearing a face mask in public places. Perhaps, there is a need for a global public health campaign to raise awareness of reducing the burden of comorbidities.

Conclusion

There is a crucial need to better recognize the full laboratory spectrum of COVID-19 in the different populations aiming for early diagnosis of the disease. Lymphopenia and elevated CRP levels are seen mostly in elderly patients. Differences in the distribution, functioning and viral receptors are a possible reason for the age-related differences in the clinical and laboratory features on COVID-19 patients [31]. Elderly patients with COVID-19 have a higher mortality rate. Elderly patients with COVID-19 need more medical care [32]. Thus early diagnosis and supportive care are of great importance for elderly COVID-19 patients.

Recommendation

Elderly adults are a group of people with special needs that require consideration during disaster planning and the implementation of measures to curb the effects of pandemics. This population should not be marginalized regarding health and other social requirements. Management protocols should allow the necessary flexibility in treating older people during pandemics as they have higher risks of acquiring the infection, more aggressive clinical courses and worse outcome. Due to multifactorial reasons, the elderly population of our country is suffering most from this deadly novel virus. Early detection, prompt management, and rapid vaccination against coronavirus can save many lives in this age group. The finding from the trial will help to design the appropriate regimen of management, which will reduce mortality and morbidity and indirectly contribute to better management of COVID-19 infection and thus improvement of health.

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