Demographic and Clinical Characteristics of Covid-19 Positive Cases: An Exploratory Retrospective Study in a Covid-19 Referral Hospital

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In late 2019, a novel coronavirus emerged in Wuhan, China, causing an atypical pneumonia- like illness. Scientists subsequently isolated the virus, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), in January 2020. This highly contagious virus rapidly spread worldwide, triggering a global public health emergency. The ongoing Covid-19 pandemic necessitates continuous evaluation of the characteristics of infected individuals. This study aimed to investigate the demographic and clinical features of patients diagnosed with Covid-19 at a tertiary care hospital in Bangladesh. This retrospective cross-sectional study was conducted between November 2023 and February 2024 at the Department of Respiratory Medicine, Uttara Adhunik Medical College Hospital (UAMCH), Dhaka, Bangladesh. The study involved collaboration with the departments of Virology and the hospital's Covid Unit. Data were collected from the medical records of 200 confirmed Covid-19-positive cases admitted upon arrival at the hospital. Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 23.0. Of the 200 participants, the most frequent age group was 46-60 years old, representing 42% (84 patients). Males comprised the majority (73.0%, 145 patients), and most participants resided in urban areas of Bangladesh (86.5%, 173 patients). The socioeconomic analysis revealed that the upper-class category had the highest frequency (85.0%, 170 patients). Diabetes Mellitus (DM) emerged as the most prevalent co-morbidity (58.5%, 117 patients). Regarding clinical presentation, fever was the most frequent symptom (76.0%, 152 patients), followed by cough (47.5%, 95 patients), shortness of breath (SOB) (27.5%, 55 patients), and pneumonia (15.0%, 30 patients). Less frequent symptoms included acute respiratory distress syndrome (ARDS), lower respiratory tract infection (LRTI), and chest pain. The mean systolic and diastolic blood pressure readings were 126.61±14.58 mmHg and 77.24±12.44 mmHg respectively. The mean oxygen saturation (SaO$_2$) was 93.39±5.53%. This study investigated that the most frequent age group was (46-60) years. The male dominant in Covid-19-positive cases. Diabetes Mellitus (DM) was observed as the most frequent co-morbidity. The common symptoms of Covid-19-positive cases were fever, cough, SOB, pneumonia acute respiratory distress syndrome, lower respiratory tract infection, chest pain, high blood pressure and low oxygen saturation.

Introduction

In late 2019, the city of Wuhan in China encountered an atypical pneumonia-like illness with an unidentified origin[1]. On January 7, 2020, scientists extracted this new strain of Coronavirus from the respiratory secretions of these individuals. On February 11, 2020, it was officially designated as Severe Acute Respiratory Syndrome Coronavirus type two (SARS-CoV2) by the International Committee on Taxonomy of Viruses[2]. The sickness caused by this virus has been designated as coronavirus disease 2019 (Covid-19) also on 11 February, 2020 by the World Health Organization (WHO) following previously developed guidelines for animal health. On 11 March, 2020, after the Covid-19 outbreak had expanded globally and there were 118,319 confirmed cases and 4292 confirmed deaths, the World Health Organization (WHO) officially proclaimed it a global pandemic[3].

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SARS-CoV-2 belongs to the Corona viridae family and has a genome composed of a single-stranded positive-sense RNA. SARS-COV-2 and SARS-CoV are genetically similar as they both belong to the beta coronavirus family[4]. The clinical presentation of Covid-19 ranges from asymptomatic infection to severe viral pneumonia accompanied by multisystem failure, which can ultimately result in death[5]. The main clinical symptoms include fever, dry cough, muscle pain, fatigue, shortness of breath etc. The chest radiography reveals bilateral lung infiltrations, which are suggestive of pneumonia. Additionally, the laboratory results indicate an elevated erythrocyte sedimentation rate, C-reactive protein, and lymphopenia[6]. In more serious instances, individuals may have acute respiratory distress syndrome, acute heart and renal damage and shock, which can potentially result in irreversible organ failure and mortality[7]. The onset of severe disease typically occurs around one week following the initial appearance of symptoms. Dyspnea, which refers to difficulty in breathing, is the prevailing symptom of severe illness and is frequently accompanied with low levels of oxygen in the blood, known as hypoxemia. Severe Covid-19 in adults is characterized by specific criteria, including difficulty breathing (dyspnoea), a high respiratory rate of 30 or more breaths per minute, low blood oxygen saturation of 93.0% or less, a low ratio of arterial oxygen pressure to inspired oxygen fraction (less than 300 mmHg), or the presence of infiltrates in over 50.0% of the lung field within 24 to 48 hours of symptom onset[8]. The initial incidence was documented on March 8th, 2020, in Bangladesh and the first fatality was registered on March 18th, 2020. Covid-19 has primarily affected individuals who are young professionals or working individuals. IEDCR specifically indicated that individuals between the ages of 21 and 50 accounted for 68.0% of the confirmed Covid-19 cases. Conversely, individuals over the age of 50 who were sick made up 21.0% of the overall infected population. Individuals under the age of 20 accounted for 11.0% of the overall number of infected cases[9]. The age distribution of Covid-19 positive patients in Bangladesh and India is similar, but it differs significantly from that of the USA and Italy, where it has been more severely affected. Out of the confirmed patients in India, 75.09% were under the age of 50. Thus far, the majority of Covid-19 infections in India have affected the working age population. Conversely, the Covid-19 infection rate among individuals aged 19 to 50 years in Italy is only 27.2%. In the United States, individuals who were infected with Covid-19 and were over the age of 50 accounted for 50.63% of the cases[10]. According to the World Health Organization (WHO), nations with fragile health systems are more susceptible to risks. As of August 11, 2020, the disease has affected a minimum of 204,173,377 individuals and has caused a minimum of 742,311 fatalities worldwide. The World Health Organization's emergency committee declared that the transmission of Covid-19 may be halted with the use of rigorous measures such as contact tracing, early identification, isolation and immediate medical intervention[11]. The objective of this study was to identify the demographic and clinical attributes of individuals who tested positive for Covid-19.

Objectives

General objective: To determine the demographic and clinical characteristics of the Covid-19 positive cases attending in a tertiary level hospital.

Specific objectives: i) To know the demographic characteristics of the Covid-19 positive cases, ii) To determine the associated diseases with the Covid-19 positive cases, iii) To identify the clinical symptoms of Covid-19 positive cases at the onset of the hospital and iv) To observe the clinical parameters of Covid-19 positive cases at the onset of the hospital.

Methods

This study is a retrospective cross-sectional investigation that took place from November 2023 to February 2024 at the Department of Respiratory Medicine, Uttara Adhunik Medical College Hospital (UAMCH), Dhaka, Bangladesh. The study was undertaken in partnership with the departments of Virology and the Covid Unit. The study had official permission from the registrar of the hospital. A deliberate consecutive sampling strategy was used. A total of 200 Covid-19 cases were included in the study, without considering age or gender. Data were obtained from the hospital registry through the utilization of a pre-established questionnaire and a Case report form (CRF). The gathered data underwent a process of cleansing, editing, and inputting into a computer for analysis using the Statistical Package for

Social Sciences (SPSS) software version 23.0. An inferential statistical study was conducted. The findings are displayed in tables and charts, showing the frequencies and percentages. The inclusion and exclusion criteria of this study were as follows:

Inclusion criteria: i) Confirmed Covid-19 positive cases by RT-PCR lab test, ii) Age: Any and iii) Having complete information in the hospital registry

Exclusion criteria: i) Non Covid-19 cases and ii) Having incomplete information in the hospital registry.

Results

Table I summarizes the age distribution of the study participants. The 46-60 years age group was the most frequent, accounting for 42.0% (84 patients) of the sample. This was followed by the 61-75 year age group (36.5%, 73 patients), the 31-45 year age group (11.0%, 22 patients), the over 75 year age group (7.5%, 15 patients), and the under 30 year age group (3.0%, 6 patients). The mean age was 58.28±12.45 years, the median age was 58 years, and the modal age was 50 years. The age range spanned from 16 to 90 years. Table II presents the gender breakdown of the study participants. Males comprised the majority of cases, accounting for 73.0% (145 patients). Females made up the remaining 27.0% (55 patients).

Table I: Age distribution of Covid-19 positive cases (n=200)

Age in years	Frequency (n)	Percent (%)
<30	06	03.0
31-45	22	11.0
46-60	84	42.0
61-75	73	36.5
>75	15	7.5
Total	200	100.0
Mean age (years)	58.28±12.45	
Median	58	
Mode	50	
Range	16-90	

Table II: Gender distribution of Covid-19 positive cases (n=200)

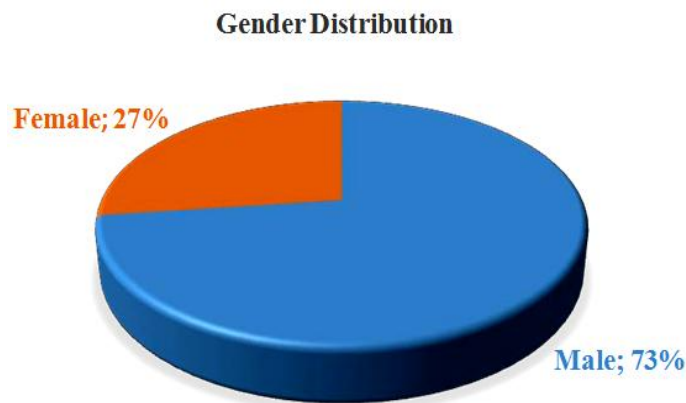| Sex distribution	Frequency (n)	Percent (%)
Male	145	73.0
Female	55	27.0
Total	200	100.0

Gender Distribution

Figure 1: Shows the gender distribution of Covid-19 positive cases (n=200)

Table III: Residence distribution of Covid-19 positive cases (n=200)

Residence distribution	Frequency (n)	Percent (%)
Urban	173	86.5
Rural	27	13.5
Total	200	100

Table III illustrates the distribution of study participants by residence. The majority, 86.5% (173 patients), resided in urban areas of Bangladesh. The remaining 13.5% (27 patients) came from rural areas.

Table IV: Distribution of socio-economic condition of Covid-19 positive cases (n=200)

Socio-economic condition	Frequency (n)	Percent (%)
Upper class	170	85.0
Middle class	20	10.0
Lower class	10	05.0

Table IV summarizes the socioeconomic background of the study participants. The upper class category had the highest frequency, with 170 patients (85.0%). The middle class and lower class categories comprised 20 patients (10.0%) and 10 patients (5.0%), respectively.

Table V: Distribution of co-morbidities associated with Covid-19 positive cases (n=200)

Co-morbidities	Frequency (n)	Percent (%)
Hypertension (HTN)	108	54.0
Diabetes mellitus (DM)	117	58.5
Cardio vascular disease (CVD)	12	06.0
Chronic kidney disease (CKD)	04	02.0
Hypothyroid	05	02.5
Stenting	12	06.0
Hypokalemia	05	02.5
Chronic obstructive pulmonary disease(COPD)	03	01.5
Bronchial asthma	33	16.5
Benign prostatic hyperplasia (BPH)	03	01.5
Benign enlargement of the prostate (BEP)	03	01.5
Ischemic heart disease (IHD)	20	10.0
Non-ST-elevation myocardial infarction (NSTEMI)	11	05.5

Table V details the distribution of comorbidities within the study population. Diabetes Mellitus (DM) was the most prevalent co-morbidity, affecting 117 patients (58.5%). This was followed by Hypertension (HTN) at 54.0% (108 patients), Bronchial Asthma (16.5%, 33 patients), Ischemic Heart Disease (IHD) (10.0%, 20 patients), and Cardiovascular Disease (CVD) (6.0%, 12 patients). Less frequent comorbidities included stenting (6.0%, 12 patients), Non-ST-elevation myocardial infarction (NSTEMI) (5.5%, 11 patients), Hypothyroidism (2.5%, 5 patients), and Hypokalemia (2.5%, 5 patients). Chronic Kidney Disease (CKD) affected 2.0% (4 patients), Chronic Obstructive Pulmonary Disease (COPD) affected 1.5% (3 patients), and both Benign Prostatic Hyperplasia (BPH) and Benign Enlargement of the Prostate (BEP) affected 1.5% (3 patients) of the participants.
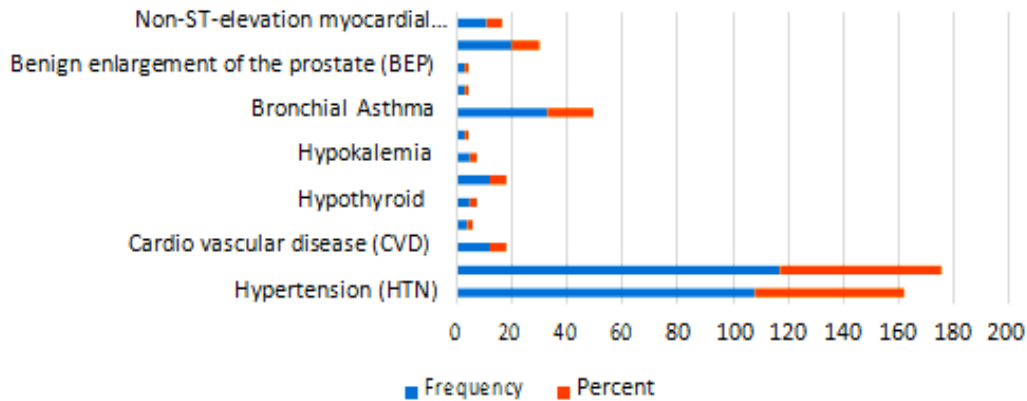
Distribution of Comorbidities

Figure 2: Shows the comorbidities distribution of Covid-19 positive cases (n=200)

Table VI: Clinical symptoms of Covid-19 positive cases at the onset of the hospital (n=200)

Clinical presentation	Frequency (n)	Percentage (%)
Cough	95	47.5
Fever	152	76.0
SOB	55	27.5
Acute respiratory distress syndrome	09	04.5
Lower respiratory tract infection	04	02.0
pneumonia	30	15.0
Chest pain	01	00.5

Table VI summarizes the clinical presentations observed among the study participants. Fever was the most frequent symptom, reported by 76.0% (152 patients) of the participants. This was followed by cough (47.5%, 95 patients), shortness of breath (SOB) (27.5%, 55 patients), pneumonia (15.0%, 30 patients), acute respiratory distress syndrome (ARDS) (4.5%, 9 patients), lower respiratory tract infection (LRTI) (2.0%, 4 patients), and chest pain (0.5%, 1 patient).
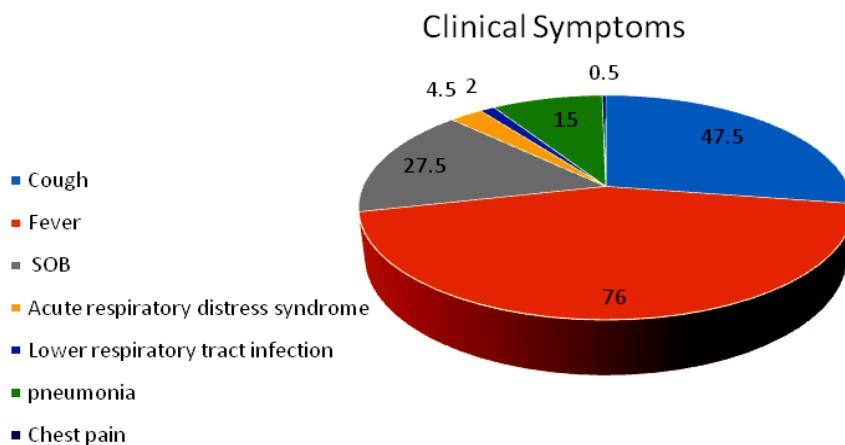
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Figure 3: Shows the distribution of clinical symptoms Covid-19 positive cases (n=200)

Table VII: Clinical parameters of Covid-19 positive cases at the onset of the hospital (n=200)

Clinical parameters	Mean±SD
Systolic BP	126.61±14.58 mmHg
Diastolic BP	77.24±12.44 mmHg
SBPO$_2$ (%)	93.39±5.53

Table VII shows the clinical parameters of Covid-19-positive cases. The mean systolic BP of the patients was observed to be 126.61±14.58 mmHg followed the mean diastolic BP 77.24±12.44 mmHg and the mean SBPO$_2$ 93.39±5.53%.

Discussion
In this study, a total of 200 confirmed Covid-19-positive cases were enrolled. This study investigated the demographic characteristics of Covid-19-positive cases, with a focus on age distribution. The most frequent age group was 46-60 years old, representing 42.0% (84 patients) of the participants. The following age groups were also observed: 61-75 years old (36.5%, 73 patients), 31-45 years old (11.0%, 22 patients), over 75 years old (7.5%, 15 patients), and under 30 years old (3.0%, 6 patients). The mean age was 58.28±12.45 years, the median age was 58 years, and the modal age was 50 years. The age range spanned from 16 to 90 years. This study finding on age distribution are consistent with similar studies conducted elsewhere. For instance, a in China reported a high prevalence in the 40-59 year age group[12]. This alignment suggests a potential trend in Covid-19 cases across different populations.This study found that males comprised the majority of Covid-19 positive cases (73.0%, 145 patients) compared to females (27.0%, 55 patients). Regarding residence, a higher proportion of participants resided in urban areas of Bangladesh (86.5%, 173 patients) compared to rural areas (13.5%, 27 patients). The socioeconomic analysis revealed that the upper class category had the highest frequency of Covid-19 positive cases (85%, 170 patients), followed by the middle class (10.0%, 20 patients) and lower class (5.0%, 10 patients). This study findings on gender distribution are consistent with a multi-centre study conducted in Bangladesh reported a similar male dominance (73%) among Covid-19 positive cases[13]. This suggests that males may be at higher risk of contracting the virus in this region, or there could be differences in testing rates between genders. Further investigation is needed to understand these disparities.In this study, it was found that the most common symptom reported by participants was fever, with 152 individuals (76%) experiencing it. This was followed by cough, which was reported by 95 individuals (47.5%), shortness of breath by 55 individuals (27.5%), pneumonia by 30 individuals (15.0%), acute respiratory distress syndrome by 9 individuals (4.5%), lower respiratory tract infection by 4 individuals (2.0%), and chest pain by 1 individual (0.5%). The average systolic blood pressure of the patients was found to be 126.61±14.58 mmHg, while the average diastolic blood pressure was 77.24±12.44 mmHg. Additionally, the average arterial oxygen saturation was 93.39±5.53%. A separate investigation carried out at Shaheed Suhrawardy Medical College Hospital in Dhaka between July 2020 and December 2020 revealed that the majority of patients experienced symptoms such as fever (95.0%), cough (88.4%), dyspnea (43.8%), pneumonia (37.4%) and severe pneumonia (36.4%). Within this study, 40.0% of the patients experienced a digestive symptom. Specifically, 47.9% reported diarrhea, 55.5% reported vomiting, 16.5% reported loss of appetite, 29.8% reported abdominal discomfort, 24.8% showed abdominal bloating, 00.0% reported reflux, and 3.3% reported jaundice. The study sample comprised 121 patients who tested positive for Covid-19. Of these, 57.85% were male and 42.15% were female, which closely aligns with the findings of our study[14]. Similar findings were obtained in other research conducted in Bangladesh and several places worldwide[15,16,17,18,19]. Diabetes mellitus (DM) emerged as the most prevalent co-morbidity among participants in this study, affecting 58.5% (117 patients). This was followed by hypertension

(HTN) at 54.0% (108 patients). Other notable comorbidities included bronchial asthma (16.5%), ischemic heart disease (IHD) (10.0%), and cardiovascular disease (CVD) (6.0%). Less frequent comorbidities included stenting, non-ST-elevation myocardial infarction (NSTEMI), hypothyroidism, hypokalemia, chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), benign prostatic hyperplasia (BPH), and benign enlargement of the prostate (BEP). This study findings on the prevalence of diabetes and hypertension as the leading comorbidities align with a 2021 study conducted in Malaysia[15]. This highlights the vulnerability of individuals with these conditions to severe Covid-19 outcomes. Over 43.8% of cases had fever, while 37.1% reported with cough. Out of the 25 cases that needed intubations or mechanical ventilation, 68.0% had hypertension, 88.0% had fever, 40.0% had dyspnoea and 44.0% were sluggish. The study found that older individuals (aged 60 years) had a significantly higher likelihood (adjusted odds ratio of 3.9) of requiring intubations or mechanical ventilation. Additionally, individuals with hypertension had a 5.7 times higher odds, those with fever had a 9.8 times higher odds, those with dyspnea had a 9.6 times higher odds, and those with lethargy had a 7.9 times higher odds of requiring intubations or mechanical ventilation compared to those who did not require it[20]. Other studies have also reported similar findings regarding the clinical presentation and comorbidities of individuals who tested positive for Covid-19[21,22,23,24]. The results of this study will be highly valuable to policymakers, physicians, and medical workers in effectively managing and treating individuals who have tested positive with Covid-19.

Conclusion
This study examined the age group that occurred most frequently, which was those between the ages of 46 and 60 years. Males are overrepresented in Covid-19 positive cases. Diabetes Mellitus (DM) was the most prevalent co-morbidity identified. The typical symptoms exhibited by those who tested positive for Covid-19 included fever, cough, shortness of breath, pneumonia, acute respiratory distress syndrome, lower respiratory tract infection, chest discomfort, hypertension, and decreased oxygen saturation.

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