

# Clinical and Radiological Characteristics of Young COVID-19 Patients in a Tertiary Hospital of Dhaka, Bangladesh

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## Abstract

**Introduction:** Since the initial identification of Coronavirus in 2019, it has claimed a total of 4,499,311 lives worldwide as of August 28, 2021. It is a global pandemic that can spread from human to human rapidly. Although it was primarily believed that SARS-CoV-2 mainly affects the elderly and immunosuppressed, recent statistics have confirmed that COVID-19 can affect people of all ages and gender. The present study was conducted to learn more about the effects and similarities of Coronavirus on the younger population in an effort to help medical professionals and emergency workers in their fight against this global pandemic.

**Aim of the study:** The study aims to observe the effectiveness of HRCT as a diagnostic tool in determining Covid-19 in young patients

**Methods:** This retrospective, single-center, descriptive clinical study was conducted at the Child Corona Unit of Dhaka Medical College Hospital, Dhaka, Bangladesh. A total of 1420 patients presenting with cough, fever, respiratory distress or any other symptoms of Covid were selected for the study. RT-PCR testing was done in all groups, and the participants were divided into two groups, Group A and Group B. Group A consisted of 50 RT-PCR (+) positive patients, and Group B consisted of 76 RT-PCR (-) negative patients with severe covid symptoms. Following the inclusion and exclusion criteria and due to financial constraints, the final sample size was 126, with 50 being in Group A, and 76 being in Group B.

**Result:** Male prevalence was observed in both groups of the participants. The overall male: female ratio was 1.37:1. An overwhelming portion of group A participants (95.37%) had moderate levels of illness, and the remaining 4.63% had severe illness. Among the group B participants, 72.22% had moderate levels of illness, 11.11% were severe cases, and 16.67% had critical levels of illness. Fever, cough, and rhinorrhea were some common clinical symptoms among the participants of both groups. Cardiac damage was a common comorbidity among participants of both groups, while mycoplasma infection was present in 12.04% of group A and 44.44% of group B participants. Among the HRCT characteristics, ground-glass opacity, vascular thickening shadowing, and abnormalities in the lower lobe of the lung had a higher presentation in group B compared to group A. Interstitial abnormalities were only present among group A participants.

**Conclusion:** The study showed that the COVID-19 virus can be present in a person despite showing no symptoms. People with severe COVID symptoms can still show up as negative in the RT-PCR test. In such cases, HRCT can determine the presence and severity of the Coronavirus in patients.

**Keyword:** COVID, Corona, Respiratory, Chest, Youth, RT-PCR, HRCT

Date of Submission: 19-11-2022

Date of Acceptance: 03-12-2022

## **I. Introduction**

Coronavirus is a type of pathogen responsible for atypical pneumonia. It was first recorded as an atypical pneumonia case in the Wuhan region of China, in December 2019.<sup>[1]</sup> It was later identified and named as SARS-CoV-2 in the February of 2020, by the World Health Organization (WHO).<sup>[2]</sup> WHO has declared COVID-19 as a global pandemic, and it is causing an increasing number of incidents and mortality each day. Although initially it was believed to only affect the elderly, recent statistics have shown that COVID can affect people of all ages, and the children are also affected by COVID, although in a smaller amount.<sup>[3]</sup> Although there have been reports of mortality in children as a cause of COVID-19,<sup>[4]</sup> further studies suggest that in terms of CT manifestation and symptoms, COVID-19 is much less severe in children compared to adults.<sup>[5],[6]</sup> The clinical characteristics of a covid patient are quite similar in both children and adults, and the most common characteristics are fever, cough, headache, shortness of breath, etc. To contain the spread of the virus, social distancing becomes necessary, leading to a severe lockdown in many countries. This has impacted greatly on the global economy.<sup>[7],[8]</sup> Because of such adverse effects of covid on our everyday life, the whole world is racing to come up with proper countermeasures in order to contain the spread of this virus. Early detection and isolation treatment are important to control the progression and spread of the disease. As clinical presentations of COVID-19 have mostly been associated with respiratory problems,<sup>[9]</sup> radiologic imaging in screening and diagnosis of suspected COVID-19 cases has been debated as a primary method of recognition since the start of the pandemic.<sup>[10]</sup> This is even more true as the identification of COVID-19 patients based on respiratory complaints shows a significant amount of overlap with other respiratory tract infections such as influenza virus or even the common flu.<sup>[11]</sup> At present, the primary method used in many hospitals to identify COVID-19 is by doing an RT-PCR test. But the test results can often be negative even if the patient has COVID, and further testing is required to confirm a diagnosis. Chest imaging is one of the integral components of assessing the complications of COVID-19 progression.<sup>[12],[13],[14]</sup> The present study was conducted to observe the effectiveness of HRCT as a diagnostic method of Covid

## **II. Objective**

### **General Objective**

- To observe the effectiveness of HRCT as a method of determining Covid-19 patients

### **Specific Objectives**

- To find if there are any unique symptoms in the HRCT features of young Covid-19 patients.

## **III. Methods**

This was a retrospective, single-center, descriptive clinical study conducted at the Child Corona Unit of Dhaka Medical College Hospital, Dhaka, Bangladesh. The study period was from July 2020 to June 2021. At the beginning of the study, a total of 1420 patients presenting with cough, fever, respiratory distress or any other symptoms of Covid were selected for the study. RT-PCR testing was done in all groups, and the participants were divided into two groups, Group A and Group B. Group A consisted of all RT-PCR (+) positive patients, and Group B consisted of RT-PCR (-) negative patients with severe covid symptoms. Depending on the severity of the symptoms and presenting illness, a total of 259 patients from both groups were advised for HRCT. But due to financial constraints and patient discharge, HRCT was possible for only 126 patients. Among them, 108 belonged to Group A, and the remaining 18 belonged to Group B. Informed written consent was obtained from the legal guardians of the study participants, and Ethical Approval was taken from the Institutional Ethics Committee of the study hospital.

### **Inclusion Criteria**

- Only Children under 16 years of age
- Children of both gender
- Severe presentation of covid symptoms (cough, fever, respiratory distress)

### **Exclusion Criteria**

- Mentally ill.
- Children 16 years or older
- RT-PCR and CT negative participants
- Exclude those affected with other chronic diseases etc.

#### IV. Results

**Table 1:** Gender Distribution of the groups (n=126)

Gender	Group A (n=50)		Group B (n=76)	
	Percentage	Frequency	Percentage	Frequency
Male	52.78%	26	55.56%	42
Female	47.22%	24	44.44%	34

Male prevalence was slightly higher in both groups. Group A had 52.78% male and 47.22% female, and Group B had 55.56% male and 44.44% female. The overall male: female ratio was 1.13:1

**Table 2:** Severity of illness among the groups (n=126)

Severity of Illness	Group A (n=50)		Group B (n=76)	
	Percentage	Frequency	Percentage	Frequency
Moderate	95.37%	48	72.22%	55
Severe	0.00%	0	11.11%	8
Critical	4.63%	2	16.67%	13

Moderate levels of severity were observed among the participants of both groups. Among Group A participants, 95.37% had moderate levels of illness, and 4.63% had critical levels of illness. Among Group B participants, 77.22% were moderately ill, 11.11% were severely ill and the remaining 16.67% had critical levels of illness.

**Table 3:** Clinical manifestations among the groups (n=126)

Clinical Manifestations	Group A (n=50)		Group B (n=76)	
	Percentage	Frequency	Percentage	Frequency
Fever	66.67%	33	83.33%	63
Cough	49.07%	25	72.22%	55
Fatigue	4.63%	2	0.00%	0
Sore Throat	1.85%	1	0.00%	0
Diarrhea	7.41%	4	0.00%	0
Abdominal Pain	4.63%	2	0.00%	0
Rhinorrhea	15.74%	8	11.11%	8
Loss of Appetite	4.63%	2	0.00%	0
Chest Pain	0.00%	0	5.56%	4
Intussusception	1.85%	1	0.00%	0
No Symptoms	9.26%	5	0.00%	0

Fever, cough, and rhinorrhea was common clinical manifestation in both groups. Among Group B participants, 83.33% had fever, 72.22% had cough, and 11.11% had rhinorrhea, and 5.56% had chest pain. Group A participants had many more clinical manifestations, among which, fever and cough were the most common, presenting in 66.67% and 49.07% respectively. Among the other manifestations, rhinorrhea was present in 15.74% of the participants. 9.26% of the Group A participants showed no clinical manifestations.

**Table 4:** Comorbidities among the groups (n=126)

Comorbidity	Group A (n=50)		Group B (n=76)	
	Percentage	Frequency	Percentage	Frequency
Cardiac Damage	9.26%	5	11.11%	8
Mycoplasma Infarction	12.04%	6	44.44%	34
Respiratory Syncytial Virus infection	2.00%	1	0.00%	0

Among Group B participants, 11.11% had cardiac damage, and 44.44% had mycoplasma infarction. Among the Group A participants, 12.04% had mycoplasma infarction, 9.26% had cardiac damage, and respiratory syncytial virus infection was present in 2.00% of the participants in group A.

**Table 5:** Difference in HRCT characteristics among Group A and Group B participants (n=332)

HRCT Characteristics	Group A (n=50)		Group B (n=76)		p-value
	Percentage	Frequency	Percentage	Frequency	
Ground Glass opacity	68.00%	34	83.33%	63	0.128
Local Patchy Shadowing	37.04%	19	27.78%	21	0.285
Bilateral Patchy Shadowing	21.30%	11	16.67%	13	0.677
Interstitial Abnormalities	7.41%	4	0.00%	0	0.186
Sub pleural	95.37%	48	83.33%	63	0.008
Upper Lobe of the Lung	50.93%	25	50.00%	38	0.923
Middle lobe of the Lung	21.30%	11	22.22%	17	0.937
Lower Lobe of the Lung	64.81%	32	72.22%	55	0.389
Vascular thickening shadowing	23.15%	12	38.89%	30	0.089

HRCT characteristics were compared among the group A and group B participants. P-value of <0.05 was considered statistically significant, which was the case for sub pleural characteristics of group A and group B participants. The p-value was 0.008, making it statistically significant. The difference of other characteristics between group A and group B participants was statistically non-significant.

### V. Discussion

The severe outbreak of SARS-CoV-2 infection has spread worldwide, originating from China.<sup>[15],[16]</sup> The World Health Organization has defined it as a public health emergency of international concern. The Coronaviruses are the largest known single-stranded RNA viruses.<sup>[17]</sup> The clinical manifestations of Coronavirus are primarily respiratory in nature, though gastrointestinal, cardiac, and even neurological complaints have been observed. The clinical presentations of Coronavirus often have a significant overlap with other respiratory ailments, making them hard to identify through symptoms only.<sup>[11]</sup> The proper identification of covid-19 patients and carriers is necessary to control and subdue this global pandemic as soon as possible. The primary testing method for covid-19 is presently the RT-PCR test, and although it is reliable, it is not always accurate. X-ray and Chest CT are often used alongside laboratory testing to identify coronavirus. Chest CT has been frequently used in the imaging of Covid-19 due to its detailed anatomic resolution, affordability, and availability.<sup>[12],[18]</sup> Initially, coronavirus was believed to only affect the elderly, but recent statistics have shown that it can affect people of all ages. As a result, few studies have been conducted on the symptoms and characteristics of coronavirus in children. The present study was conducted to observe the effectiveness of HRCT in the determination of coronavirus in selected young participants. In the present study, the participants were selected based on the severity of illness and presenting symptoms, and then divided in two groups based on RT-PCR test results. Group A consisted of 50 RT-PCR (+) patients, while Group B consisted of 76 RT-PCR (-) participants. The RT-PCR (-) patients were selected for Group B because the RT-PCR test is not always accurate, and the patients had symptoms of COVID despite being negative. Higher male prevalence was observed in both groups after observing the male-female distribution. The overall male-to-female ratio was 1.37:1. The higher male prevalence was similar to the findings of few other studies worldwide.<sup>[19],[20]</sup> In a study conducted in Wuhan, China, a significant risk factor was observed among the male population for prolonged COVID-19 symptoms.<sup>[21]</sup> But a recent study has shown contrary results, where the male and female prevalence ratio was almost similar.<sup>[22]</sup> Majority of the patients from group A (95.37%) had moderate levels of illness, with only 4.63% being in the critical group. Among the group B participants, 72.22% had moderate levels of illness, 11.11% were severe cases, and 16.67% had critical levels of illness. This was understandable, as the

participants of group B were admitted to the study despite testing negative in the RT-PCR test, due to their symptoms and severity of the fever. After observing the clinical manifestation, fever, cough, and rhinorrhea were common among both groups. Fever was the highest occurring symptom in all three groups. 66.67% of Group A, and 83.33% of Group B had fever. This was similar to other studies on COVID-19.<sup>[23],[24]</sup> Among the group A participants, no symptoms were observed in 9.26% of the cases. Participants of group A showed many other clinical symptoms like fatigue, sore throat, diarrhea, abdominal pain, loss of appetite, etc., while only fever, cough, chest pain and rhinorrhea were present as clinical manifestations in group B participants. Chest pain was not observed in any of the Group A participants. Clinical comorbidity was observed among participants of both groups. The highest present comorbidity among the participants of group A was Mycoplasma Infarction, present in 12.04% of cases. Cardiac damage was present in 9.26% of the participants, and respiratory syncytial virus infection was present in 2% of cases among the participants of group A. Among the participants of group B, Mycoplasma Infarction was observed in 44.44% of cases, while cardiac damage was observed among 11.11% of cases. HRCT test was performed on both group A and group B participants. Both groups had some common CT characteristics, while some characteristics were only present in group A participants. Ground Glass Opacity was present in 68% among the group A participants, while the incidence was higher in Group B, at 83.33%. Local patchy shadowing was observed in 37.04% of group A and 28.78% of group B participants, while bilateral patchy shadowing was present in 21.30% of group A and 16.67% of group B participants. Intestinal abnormalities were only present in 7.41% of the group A participants, and none in group B. Sub pleural characteristics were present in 95.37% of group A and 83.33% of group B participants. This was the only CT characteristic with statistically significant difference ( $p < 0.05$ ) in group A and group B. Abnormalities in the upper lobe and the middle lobe of the lung had an almost similar percentage in both group A and group B, while abnormalities in the lower lobe of the lung was present in 64.81% of group A and 72.22% of group B participants. Vascular thickening shadow also had a slightly higher percentage among group B participants. The present study showed that RT-PCR is only one quick test to determine the COVID-19 cases, and HRCT can further determine if a person has the coronavirus or not.

#### *Limitations of The Study*

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community. Lack of funding resulted in a smaller sample size for all three groups.

**Funding:** No funding sources

**Conflict of interest:** None declared

**Ethical approval:** The study was approved by the Institutional Ethics Committee

## **VI. Conclusion**

The study showed that the COVID-19 virus can be present in a person despite showing no symptoms, and the present method of primary testing for covid, (RT-PCR) is not always accurate. People with severe covid symptoms can still show up as negative in the RT-PCR test. In such cases, HRCT can determine the presence and severity of the coronavirus, and further treatment can be provided based on the HRCT findings.

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Dr. Fatema Farzana , et. al. "Clinical and Radiological Characteristics of Young COVID-19 Patients in a Tertiary Hospital of Dhaka, Bangladesh." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(12), 2022, pp. 16-21.