

ORIGINAL ARTICLE

A Study On Clinical and Laboratory Profile of Children with COVID-19 Attending A Tertiary Care Hospital in Bangladesh

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Abstract

Background: An outbreak of COVID-19 caused by 2019 novel coronavirus started first in Wuhan, Hubei province of China. Thereafter it spreaded to different countries of the world. Cases among children has been increasing day by day. Despite taking all measures of prevention virus spreading is uncontrolled.

Objectives: To determine the clinical features and laboratory profile of children with COVID-19.

Methods: This was a cross sectional study conducted in Dr. MR Khan Shishu Hospital and Institute of Child Health, Dhaka. Clinical and laboratory profile were analyzed among the children (aged 0-16 years) admitted between 1st May 2020 to November 2020 with positive RT-PCR for COVID-19. Data were analyzed by using SPSS.

Results: Total 159 cases were included in the study. The most common symptom was fever (97.5%), then the second most common was cough (80.5%), other symptoms were diarrhea (28.3%), vomiting (17%), anorexia (30.8%) and weakness (30.2%). WBC count was within normal limit, leucocytosis was found in 5% cases and leucopenia in 3% cases. Few cases were reported with neutropenia and lymphopenia. Few cases were reported as thrombocytosis. ESR and CRP were high. Chest X-ray showed opacities in 62.9% cases. In most of the cases it was bilateral, few cases showed unilateral. In 37.1% cases it was normal. The disease category of all infected children remained same all through the hospital stay and no mortality was seen.

Conclusion: Children with COVID-19 had distinct clinical features. Fever and cough were the most common symptoms. WBC count was found within normal limit but ESR and CRP were high. Chest radiograph showed opacities in majority cases. The outcome of COVID-19 in children was good.

Keywords: COVID-19, clinical and laboratory profile, children, Bangladesh.

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Introduction

The pandemic disease COVID-19 first started in Wuhan, Hubei Province, China in December 2019, caused by corona virus manifested as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).¹ On 30th January 2020 World Health Organization (WHO) declared that COVID-19 a public health emergency of international concern (PHEIC).²

COVID-19 infection is a highly contagious to all age group. It spreads mainly through droplets of discharge from nose or saliva when an infected person sneezes or coughs.³ COVID19 transmits from human to human though initially it had been thought that transmission occurs through animal to human.⁴ Transmission to children may occur from asymptomatic cases.⁵ In some cases this RNA virus was detected in faecal mater, so there is every possibility of faecal-oral transmission.⁶ The vulnerability of the spread of this new coronavirus is more and this pandemic has been found to have spread throughout Asia and across the world. The number of deaths is rising quickly.⁷ In Bangladesh first case of COVID19 has been reported on 8th March 2020.^{8,9}

Despite taking all measures, virus spreading remains uncontrolled. Recent literature indicate that the mean incubation period of this disease is 3 to 5 days but it may range from 0 to 24 days.¹⁰⁻¹² The incidence of COVID-19 in children is not known due to very few cases in children.¹³ It is uncertain why there are few pediatric cases considering that children have developing immune systems, and thus should be more vulnerable to the virus. In addition, pregnant mothers were also advised to stay indoors, as the long-term and short-term consequences of the virus on the fetus and whether there can be mother-to-child vertical transmission is unknown.¹⁴

Clinical scenario of COVID-19 varies, it may be asymptomatic or critically ill. Some data shows that adult patients with corona virus infections manifest with fever, cough, respiratory distress, easy fatigue ability and lymphopenia. Elderly with co morbidities may develop severe pneumonia which may turn to severe acute respiratory syndrome and even death may occur.¹⁵⁻¹⁸ According to multiple studies it seems that children usually present milder symptoms than adult.^{19,20} However there are limited reports about clinical manifestation and laboratory profile of paediatric patients both nationally and

internationally. Due to the dearth of evidence and information on COVID-19, WHO has encouraged more research, particularly those involving children and pregnant women to give a better understanding and outline the clinical characteristics and natural history of the illness.

On the basis of clinical features and epidemiological factors all the suspected cases should be tested. When someone had contact with a patient with COVID-19, PCR testing should be done of asymptomatic to symptomatic contacts. Screening tests should be done according to local situation demands. Rapid collection of sample and testing of specimens from suspected patients should meet the case definition for COVID-19. Suspected cases should be tested for the corona virus with nucleic acid amplification tests (NAAT), such as RT-PCR for COVID-19. Outbreak can be minimized by this way.²¹

Supportive investigations that can be done includes: CBC, decrease WBC count (9-25%), decrease lymphocyte count (83%), increase WBC count (24-30%) and decrease platelet count. Poor prognosis was found in patients with lymphopenia at the beginning of the outbreak. Neutrophil to Lymphocyte ratio more than 3.5 is a poor prognostic factor. C reactive protein (CRP): Most of the patients with COVID-19 have significantly increased levels of CRP. It indicates a possibility of secondary bacterial infection. Procalcitonin: Maximum patients have normal level of procalcitonin. D-dimer: In severe cases D-dimer levels are also found significantly elevated with, bad prognosis. Liver and kidney function test, Serum Ferritin, Arterial blood gas analysis, S. LDH and D-dimer all are suggestive to detect multi organ failure.²² To address this emerging current issue, we aimed to go through both clinical and lab profile of hospitalized children.

Materials and Methods

This was a cross sectional study conducted in Dr. MR Khan Shishu Hospital and Institute of Child Health, Dhaka from 1st May to November 2020. A total of 159 children (aged 0-16 years) admitted with positive RT-PCR for COVID-19 were enrolled in the study. Nasopharyngeal swab was taken for RT-PCR test. Patients who were RT PCR for COVID was positive with any chronic disease like Cerebral palsy, Congenital heart disease, Chronic kidney disease etc. were excluded from the study.

Detailed history and clinical examinations were done. Hematological profiles (Hb%, TC, DC of WBC, ESR, Platelet count) and other test like CRP was done in all patients. Chest radiograph was also taken in all patients. Clinical and laboratory data were collected and analyzed by SPSS version 21. Informed written consent were taken from the parents. Ethical clearance from the ethical committee of Dr. MR Khan Shishu Hospital and Institute of Child Health was also taken before enrollment in the study.

Results

A total of 159 children presented with positive RT-PCR for COVID-19 were included in the study. Among them 61 (38.36%) were male patient and 98 (61.64%) were female patient (Fig 1). Male female ratio was 1:1.6. Most of the patients were from Dhaka city, few were from outside Dhaka city (Fig 2).

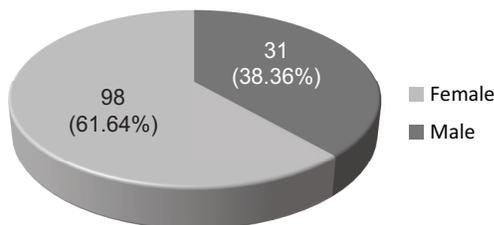


Fig 1 Distribution of male and female children with COVID-19

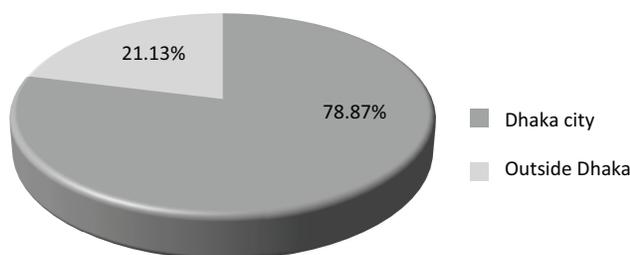


Fig 2 Category of COVID-19 patients according to the residence

Children of all age groups were affected, among them most commonly affected age group was 1-5 year (42.1%) (Table I).

Symptoms of the infected children were fever, cough, loose motion, vomiting, anorexia and weakness. Fever was the most common reported symptom in 97.5%(155) of cases. The second most common symptom was cough in 80.5%(128) of cases. Most of

the patients presented with dry cough. Diarrhoea was seen in 28.3%(45) and vomiting in 17%(27) cases. Other symptoms such as anorexia was noticed in 30.8%(49) and weakness in 30.2%(48) patients (Fig 3).

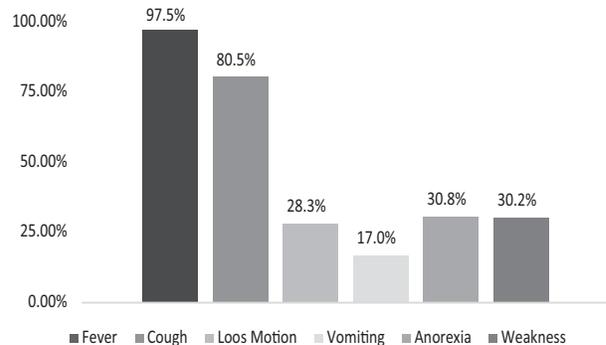


Fig 3 Clinical features in study population

Table I		
Distribution of age in study population		
	Frequency	Percent
Day 1 to <12 month	41	25.8
1 year to <5 years	67	42.1
5 years to <10 years	32	20.1
10 years to <16 years	19	12.0
Total	159	100.0

Table II		
Laboratory profile of children with COVID-19		
	Mean	Std. Deviation
Hb	11.3579	1.60164
WBC	9030.00	3154.733
Neutrophil	52.59	13.743
Lymphocyte	39.43	14.981
Platelet	315603.77	111957.950
ESR	24.11	22.162
CRP	83.9616	201.80763

All the patients were well nourished according to weight for age CDC growth chart. Mean weight was 17.24 kg and height was 92.6 cm. Mean temperature was 100°F. Oxygen saturation of the children was measured by pulse oximeter. Average range of oxygen saturation was from 80% to 90% without oxygen inhalation in maximum patients. Chest examination was done in all patients. Auscultation findings were different in different patients. Crepitation was the most common finding 87(54.7%).

Ronchi was present in 21(13.2%) and both crepitation and ronchi was present in 13(8.2%) cases.

Laboratory profile showed normal while blood cell (WBC) count. Differential counts were within normal range. Thrombocytopenia was not reported rather thrombocytosis was seen in some cases. Marked increase level of CRP was found (Table II). Chest X-ray was done in all cases. It showed opacities in 62.9% cases. Most of the cases it was bilateral few cases showed unilateral. In 37.1% cases it was normal (Table III). The disease category of all infected children remained same all through the hospital stay and no mortality was seen.

Table III
Radiological findings of children with COVID-19

	Frequency	Percent
Pneumonia	100	62.9
Normal	59	37.1
Total	159	100.0

Discussion

The number of COVID-19 in children has increased in Bangladesh as well as worldwide. In a study showed 2.2% of 44,672 confirmed cases were corona virus infected children and they were under 19 years old.²³ The great interest of the study is that there was low mortality in children in comparison to other pandemic or outbreak of viral illness. Cao et al²⁴ reported that children act as silent carriers or spreaders. This was a hospital based study whereby all the information was collected from the parents. Details history was taken from the parents and clinical examination of the patients were done and some related investigations were also done. Our study added the clinical and lab profile of hospitalized children with COVID-19.

In our study we found that the disease may present in any age group but most commonly affected age group was one to five years of age, Sarangi et al²⁵ showed similar result. In a literature review they found fever and cough were the main symptoms in children with COVID-19.²⁶ In our study we found similar result fever was present in 97% cases and cough in 80.7% cases. A literature showed malnutrition a risk factor in adult in COVID-19.²⁷ We noticed all the children were well nourished as per weight for age and it was similar to other studies.

Recently some experimental studies added that, like the severe acute respiratory syndrome coronavirus which is also called SARS-CoV and the novel coronavirus 2019 (2019-nCoV) both uses the same receptor; angiotensin converting enzyme II (ACE-II).^{28,29} So there is a possibility that the activity or may be function of ACE-II in children is not like that as in adults.

Nasopharyngeal swab was taken for RT-PCR for COVID-19 in all suspected cases and all positive cases were included in this study. Yang et al³⁰ reported that sputum and nasal swabs have potential to achieve a positive rate of 88.9% and 73.3% respectively. As a result, there is every possibility of false negative reports and there is a chance of silent spread of infections from one children to others.

The laboratory profile of adults with COVID-19 has demonstrated low WBC count with associated neutrophilia, eosinopenia, lymphopenia, and thrombocytopenia. Also, higher NLR, LMR and PLR have been associated with severe disease and used for prognostication.³¹ In this study WBC count was normal in the majority of the cases. Few cases showed leucopenia but no evidence of thrombocytopenia and this was similar to some other literatures. CRP was high in adults with sever COVID-19 in adults. We also found elevated CRP in children with COVID-19.

Chest X-ray was done in children with COVID-19. We found opacities in 62.9% cases. Xia et al³² found opacity on chest radiograph in 50% (n=20) of the paediatric patients. Literature review provide evidence that children and adult present differently. Future studies are needed to explain these differences.

COVID-19 claimed many lives in adults than in children.³³ Impaired immunity in adult patients may be possible cause of death. The co-morbidities such as diabetes, cancer and cardiovascular diseases increased prevalence of COVID-19 in adult and elderly. As a result, these patients are more prone to develop organ damage following coronavirus infection.³³ Children suffered less as they do not have comorbidities but co infection was common in one third of the patients. Typhoid fever, meningitis, urinary tract infection and acute viral hepatitis were seen in our study cases. There are many literatures which showed co infection in children with COVID-19.³⁴⁻⁴⁰

The scientific communities most urgent priorities are to pick and support the best therapies and to prevent and tackle the COVID-19 pandemic. As there was no specific treatment, study population got supportive and symptomatic treatment. This study also added that the prognosis of the children were good.

Results of this study confirmed that children with COVID-19 is not a severe disease, however severe presentation in selected population of paediatric patients may also occur. Evidence need to be generated to further establish the incidence of severe presentation of COVID-19 in infants and children with pre-existing disease.

Conclusion

Children are disproportionately affected by COVID-19 and severe symptoms are less common in children. Symptoms include fever, cough, diarrhea, vomiting, anorexia and weakness. Lab profile showed normal WBC count, high ESR and CRP. Chest X-Ray revealed opacities. Most of the patients were from Dhaka city few were from outside Dhaka city. Further experimental trials would be beneficial to provide robust evidence for development of treatment protocol to reduce morbidity in children with COVID-19.

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