

Clinical Profile and Outcome of COVID-19 in Children at a Tertiary Hospital, Dhaka

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Abstract:

Background: Since the first detection on 8th March 2020 in Bangladesh, the number of cases is rising alarmingly. The paediatric population is also getting infected in Bangladesh. So far there is no study of COVID in children in this country.

Aim: This study reports on clinical profile, laboratory findings and outcomes of COVID-19 children admitted to Combined Military Hospital (CMH), Dhaka.

Materials and Methods: In this prospective observational study, RT-PCR confirmed fifty COVID-19 patients aged below twelve years were included. Relevant investigations were done in the Armed Forces Institute of Pathology (AFIP). Data were collected from patients and/or their attendants by a structured questionnaire.

Results: Mean age was 59.96±43.24 months, 48% were male and 52% were female. Predominant symptoms were fever (44%), cough (26%), anosmia (26%) and diarrhea (12%).

Introduction:

Novel COVID-19 is an illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Common symptoms are dry cough, fever and myalgia¹. On 11th March 2020, WHO recognized this disease as a pandemic². First case of COVID-19 of Bangladesh was detected in Dhaka, on 8th March, 2020, since then numbers are raising alarmingly³. However, most studies have focused on adults and only a small number of pediatric patients with COVID-19 have been reported. Children are less commonly affected by SARS-CoV-2⁴.

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There was neutropenia in 66% and lymphocytosis in 84% of cases. Mean neutrophil and lymphocyte counts were 38±13% and 52.5±13%, respectively. Significantly raised CRP observed in 14% and high serum procalcitonin was in 10% of cases. Serum LDH, D-Dimer and ferritin were raised in 80%, 34% and 6% of affected children, respectively. The majority (98%) of the children were improved and discharged from the hospital. One child died in this cohort.

Conclusion: Fever and cough were the predominant symptoms of COVID-19 affected children in this study. Lymphocytosis and neutropenia were two important laboratory findings. Death in COVID-19 is also not uncommon.

Keywords: COVID-19 in children, clinical feature, comorbidity, laboratory findings, outcome

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The Chinese CDC reported among 72,314 cases, only 2% were less than 19 years of age⁴. In general, the clinical presentation has been less severe in pediatric cases when compared to adult cases, and the reason for this difference is unknown. De Souza TH et al found 14.2% asymptomatic, 36.3% mild, 46.0% moderate, 2.1% severe, and 1.2% critical cases in children. The most prevalent symptom was fever (47.5%), followed by cough (41.5%), nasal symptoms (11.2%), diarrhea (8.1%), and nausea/vomiting (7.1%)⁵. COVID-19 in children from six provinces in northern China are mainly caused by close family contact. Clinical manifestations and laboratory examination results may be nonspecific. Close contact history, nucleic acid detection and chest imaging are important bases for diagnosis of 2019-nCoV infection. After treatment, the short-term prognosis is good in COVID-19 in children⁶. From a small case series of 9 mothers who were infected with SARS-CoV-2, there was no evidence that SARS-CoV-2 can be vertically transmitted⁷. In a systematic review of laboratory-confirmed cases of COVID-19 in children

<18 years⁸ the complete blood count was normal in most children; 17 percent had low white blood cell count and 13 percent had either neutropenia or lymphocytopenia.⁹ In a series of 157 children with COVID-19, elevated Serum Lactate Dehydrogenase (S.LDH) was another common laboratory findings¹⁰. Elevated inflammatory markers (e.g. C - reactive protein (CRP), procalcitonin, serum ferritin, D-dimer) at admission or during hospitalization may be associated with severe disease in children¹¹.

The aim of this study was to reports on demographic profile, clinical presentation, laboratory findings and outcomes of COVID-19 patients admitted in Combined Military Hospital (CMH), Dhaka.

Methods:

In this prospective observational study. RT-PCR confirmed COVID-19 children, who admitted in CMH Dhaka since 13th April to 4th Aug 2020 were enrolled in this study. Data were collected in this period from patients and/or their attendants and attending physicians through face to face and/or telephone interview. Data were collected in a structured questionnaire, after having appropriate consent from parent. This study included all COVID-19 children from Newborn to 12 years of age irrespective of their disease severity along with their affected parents. Fifty six consecutive patients met inclusion criteria through convenient sampling from ward and six patients were excluded. The statistical analysis was done by SPSS version 23.0.

The protocol was approved by the Ethical and Scientific Committee of CMH, Dhaka. Demographic data (age, sex, etc.), clinical data (symptoms on admission, comorbidities, laboratory findings and outcome etc.) were collected and analyzed. Qualitative variables such as fever, cough etc. were expressed as frequency and percentage. Quantitative variables like age, durations, etc. were expressed as mean \pm standard deviation (SD).

Results:

Fifty patients were included in the study over a period of four months. Mean age was 59.96 ± 43.24 months, 48% were male and 52% were female (Table -I).

Table-I

Age and sex distribution of studied children (n=50)

Age	Number	Percentage
Newborn (0-28 days)	3	6
1mon to 1yr	5	10
1yr-2yr	5	10
2yr-5yr	15	30
5yr-10yr	17	34
10yr-12yr	6	12
Mean	59.96 months	
SD	43.239	
Minimum	Newborn	
Maximum	12 years	
Sex	Frequency	Percentage
Male	24	48
Female	26	52

Among fifty RT-PCR positive cases, thirty three (66%) were symptomatic and seventeen (34%) were asymptomatic

Patients got admitted with fever (44%), cough (26%), Diarrhoea (12%), Nausea and vomiting (10%), anosmia (26%), chest pain (4%) sore throat (8) constipation and abdominal pain (2) headache (2) and runny nose (6). (Table-II)

Table-II

COVID-19 symptoms of the study children (n=50)

COVID-19 symptoms	Frequency	Percentage
Fever	22	44
Cough	13	26
Difficulty in Breathing	4	8
Diarrhea	6	12
Nausea and Vomiting	5	10
Anosmia	13	26
Chest pain	2	4
Sore throat	4	8
Constipation and abdominal pain	2	
Headache	1	2
Runny nose	3	6

Out of fifty cases 34% were admitted for less than 10 days, 44% were admitted for 10-14 days and 22% were admitted for more than 14 days. Duration of hospital stay ranged from 1 to 21 days with a mean of 10.96 ± 18 days. (Figure: 1)

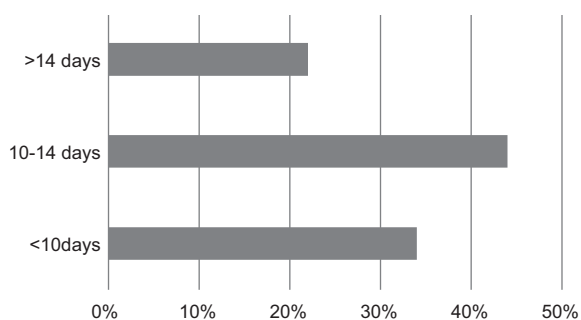


Fig.- 1: Duration of Hospital Stay (n=50)

Out of fifty cases thirteen (26%) cases were associated with co-morbidities like congenital heart disease (10%) followed by bronchial asthma, hereditary hemolytic anaemia, adenoid and ROP. (Table-III)

Table-III

Distribution of comorbidities among studied children (n=13)

Association	Frequency	Percentage
CHD	5	38.4
Hereditary hemolytic anaemia	1	7.6
Bronchial asthma	4	30.7
Enlarged adenoid	2	15.3
ROP	1	7.6

Out of fifty patient 10 patients (20%) had increased total leukocyte count, whereas 5 patients (10%) had decreased total leukocyte count, although most of the cases (70%) had leukocyte count in normal range. (Figure-2)

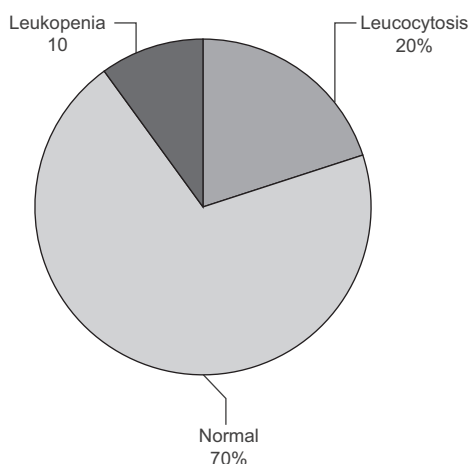


Fig.-2 : Leucocyte count in COVID 19 children

Of the fifty cases seventeen (34%) cases had normal count, thirty three (66%) cases had decreased neutrophil count, but no patient had increased neutrophil count. In case of lymphocyte count forty two (84%) cases had increased, 8 patients (16%) had normal and five case (10%) patients had decreased lymphocyte count. Mean neutrophil and lymphocyte count was $38 \pm 13\%$ and $52.5 \pm 13\%$ respectively. (Figure-3)

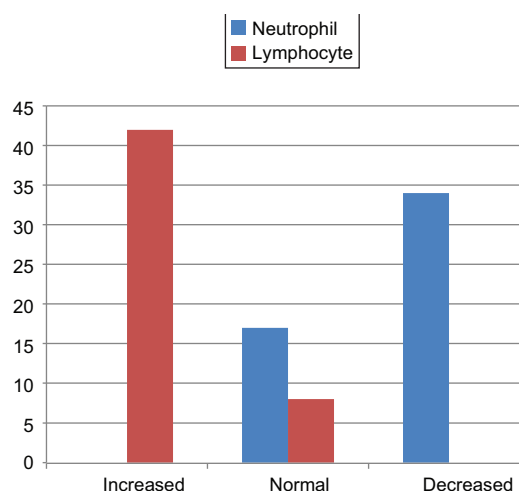


Fig.-3: Distribution of Neutrophil and Lymphocyte count in studied children

Of the fifty cases seven (14%) cases had positive CRP.(Table IV)

Table-IV

Level of CRP among the COVID-19 children (n=50)

CRP	Frequency	Percentage
Positive	7	14
Negative	43	86

Out of the fifty cases two (04%) cases had high S. creatinine level with a mean of 0.47 ± 0.19 mg/dl and five (10%) cases had high S. procalcitonin level with mean procalcitonin level was 0.0656 ± 0.4 ng/ml. Seventy (34%) cases had high D-Dimer level with a mean of 0.95 ± 1.09 μ g/ml and forty (80%) cases had high S. LDH. Out of fifty cases, only three (6%) cases had a high S. ferritin. (Table: V)

Table-V

<i>Laboratory markers of COVID-19 studied children (n=50)</i>		
S. creatinine	Frequency	Percentage
High	2	4
Normal	48	96
S. Procalcitonin		
High	5	10
Normal (<0.15ng/mL)	45	90
D-Dimer		
High	17	34
Normal (0.4-2.27 µg/ml)	33	66
S. LDH		
High	40	80
Normal (225-480U/L)	10	20
S. Ferritin		
High	3	6
Normal (Male: 28-397) Female:(6-159)	47	94

Chest X-ray was done in all cases and in all cases these were normal, therefore no HRCT chest was done.

Out of all fifty patient 49 patients were improved and discharged. Only one child died in this cohort.

Discussion:

Different studies show COVID-19 is generally a mild disease in children, including infants. However, a small proportion develops severe disease requiring ICU care and prolonged ventilation, although the outcome is rarely fatal.¹²

In this study among 50 patient 24 patient (48%) were male and 26 patients (52%) were female. COVID-19 can be found at any age, starting from newborn to adult. In this study mean age was 59.96 ± 43.24 months. Dong et al. found median age of 7 years which is almost relevant to this study¹³.

Among fifty RT-PCR positive children, thirty-three (66%) were symptomatic and seventeen (34%) were asymptomatic found in this study. However, Carmen et al. in a review, showed that 14.3% of cases were asymptomatic, and the remaining 85.7% were symptomatic, which differs from this study¹⁴.

Predominant symptoms COVID-19 of this study were fever (44%) followed by cough, anosmia, diarrhea, vomiting, anosmia and sore throat. Carmen et al.

observed a similar presentation with the present study.¹⁴ They showed that fever (59.3%) was the most typical symptom, followed by cough, rhinorrhea or pharyngeal congestion, diarrhea and sore throats were less common in their study.

Out of fifty cases, thirteen (26%) children were associated with co-morbid conditions. These were congenital heart disease, hereditary hemolytic anaemia, bronchial asthma, enlarged adenoid and ROP. Zachariah P et al. showed, 61% of the children had comorbidities in their study.¹¹ Obesity was the most common (22%) and asthma, sickle cell disease, cardiac disease, and diabetes were the other comorbidities that partially matched with the current study.

Wu et al. in a review, found abnormalities in leukocyte count about 31.08% of children and 13.51% presented with abnormal lymphocyte count¹⁵. In the present study, 34% of cases had normal and 66% had decreased neutrophil count. In lymphocyte count, 84% of cases had increased, 16% had normal and 10% of patients had reduced lymphocyte count, which differs from this study. Henry et al. showed changes in leukocyte counts, 32% of the mild cases in their study. Based on data obtained from COVID-19 studies, leukocyte indices in children appear inconsistent, differing from those reported in adults that highlight specific leukocyte trends which partially matched with this study¹⁸.

In the present study, seven (14%) patients had positive CRP, forty (80%) patients had high S. LDH and five (10%) patients had high S. procalcitonin level. Michael H et al. showed in severe disease, CRP, procalcitonin and LDH were frequently elevated¹⁷. In contrast, Li C et al. showed elevated LDH level at admission was found as an independent risk factor in adults for the severity and mortality of COVID-19 in their studies¹⁷. Lin Z et al. study reported higher serum ferritin levels in severe COVID-19 cases suggested features of systemic inflammatory reaction¹⁸. In our study, 6% of children had high S. ferritin. In this study, severe presentation of COVID-19 was not documented and biochemical markers were significantly raised, which was matched with the previous study.

Forty-nine (98%) patients were improved and discharged, only one patient (2%) died. Thus, the coronavirus disease 2019 in children seemed to have a milder disease course and better prognosis than adults.

In addition, deaths were rare, which was similar to this study¹⁹.

Limitations: Small sample size and inclusion criteria were not severity based. Children affected with COVID 19 infection were admitted due to fear of the uncertain clinical profile and outcome. Initially, there was a social stigma related to the infectivity of the disease, which created panic in society.

Conclusion:

Clinical profile of COVID 19 in children was mild and the outcome was good. Fever and cough were the predominant findings of COVID-19 affected children in this study. In contrast to the COVID in adult lymphocytosis and neutropenia were two important laboratory findings. The inflammatory markers were raised as expected. This study reports death from COVID-19 also. This study should encourage other academicians to have more researches in this field.

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