Clinical Profile of RT-PCR Positive Paediatric Patients with COVID 19: Overview from Chattogram, Bangladesh

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Abstract

Background: Coronavirus diseases 2019 (COVID-19) has become global pandemic. During the COVID-19 pandemics, caused by SARS-CoV-2, overall, children younger than 18 years are thought to account for only 1% to 2% of detected cases worldwide. COVID-19 has been found less frequent in children and studies on pediatric COVID-19 have also been less reported, especially from Bangladesh. To evaluate the clinical profile of RT-PCR-positive paediatric patients with COVID 19 in Chattogram region.

Materials and methods: This cross-sectional study was conducted in OPD, Department of Paediatrics, Chittagong Medical Colllege Hospital (CMCH) Chattogram. All post-COVID paediatric patients reported as RT-PCR positive by Microbiology department of CMCH were enrolled in the study. The study was carried out from 1/8/21 to 31/01/22. According to inclusion/exclusion criteria 96 RT-PCR positive COVID-19 paediatric patients were taken as sample by convenient sampling for this study. The diagnosis of COVID 19 infection was confirmed by RT-PCR report of nasopharyngeal or oro-pharyngeal swab. Patients' guardians were contacted over telephone to attend paediatric OPD of CMCH for clinical information & laboratory findings.

Results: Among them 96 children, 68.8% were in >5 years, 18.8% were in 1-5 years, and 12.4% were in the <1 year age group; 55.2% were female and 48.8% were male. About 66 (80%) patients had history of contact with suspected or confirmed COVID-19 patient. Total 21 patients got hospitalized. Mean ± SD of time from symptom onset to hospital admission was 4.76 ± 1.998 days. Duration of hospital stay was ranged from 4-14 days. Mean ± SD duration of hospital stay was 6.1 ± 2.385 days. Maximum (97.9%) patients had fever, 77.1% patients had cough and 29.2% patients had vomiting. Majority (82.3%) of the patients had no co-morbidities.

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Mean ± SD Hb% (g/dl) was 12.04 ± 1.817 g/dl with range: 7-16 g/dl; median (IQR) WBC (/Cumm) was 9500 (7200-16000) (Range: 3200-26000), median (IQR) Neutrophil (%) was 64 (54-71) (range: 14-90), median (IQR) Lymphocyte (%) was 28 (22-36) (range: 6-74) and median (IQR) Platelet count (/Cumm) was 200000 (172500-284000) (Range: 40000-418000). Raised CRP, D-Dimer and S. Ferritin level were found among 43 (75.4%), 8 (14.4%) and 38 (66.7%) patients respectively. Available CXR findings of 47 patients showed that, 21 (45%) had patchy opacity, 19 (40%) had no significant abnormality and 6 (13%) had bilateral consolidation. Paracetamol was the most frequently (83.2%) used drug for this infection. Oral antibiotic was used in 64.2% children, bronchodilator and zinc supplementation were given to 48.4% and 43.2% children respectively. Oxygen therapy was needed for 12.6% children. More than half (57.7%) of the patients reported to feel fatigue after COVID-19 infection. About 40.4% patients had shortness of breath, 38.5% patients had history of weight loss. And 25% patients had lost their taste/smell.

Conclusion: Clinical presentations of COVID-19 in children were mild. Fever and cough were found to be the predominant symptoms of COVID-19 affected children in this study. Vomiting, nasal congestion and altered smell were also typical symptoms. Raised CRP and S. Ferritin level were two important laboratory findings.

Key words: Clinical profile; COVID-19; RT-PCR positive paediatric patients.

Introduction

SARS-CoV-2 is a new corona virus responsible for a pandemic called COVID-19. COVID-19 causes serious acute respiratory syndromes that can cause significant morbidity and mortality.[1] Since the outbreak in Wuhan, Hubei Province, China in December 2019, Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spreaded rapidly around the world. The disease outbreak quickly spread to the rest of the world, resulting in a pandemic affecting 215 countries and territories worldwide so far.[2] The spectrum of diseases caused by the coronavirus can range from the common cold to severe acute respiratory syndrome. In a systematic review, 1–5% of the patients diagnosed with COVID-19 were reported to be pediatric cases.

Clinical manifestations in children are milder than in adults, and death due to coronavirus has been rarely seen in children.[3,4] According to CDC (Center for Disease Control and Protection), 8.1% of the patients infected with COVID-19 were children, and the mortality rate in children was <0.1%.[5]

Coronaviruses (CoVs) are enveloped, single-stranded, zoonotic, RNA viruses of a large family. The novel SARS-CoV emerged in 2002. The 2019 novel coronavirus (SARS-CoV-2) is currently causing a severe outbreak of disease (Called COVID-19) in China and multiple other countries including Bangladesh. Now it is a pandemic and global health concern. In humans, it mostly causes respiratory and gastrointestinal symptoms. Clinical manifestations range from a common cold to severe diseases such as bronchiolitis, pneumonia, ARDS, inflammatory syndrome, multi-organ failure, and even death. SARS-CoV and SARS-CoV-2 less commonly affect children and less severe disease compared with adults and are associated with lower fatality. Evidence suggests children are as likely as adults to become infected with SARS-CoV-2 but are less likely to be symptomatic. The majority of children infected by novel Corona Virus have documented household contact. In contrast, adults more often have nosocomial exposure.[6]

According to the National Guidelines on Clinical Management of Coronavirus Disease 2019 (COVID-19) in Bangladesh shows corona symptoms are Mild illness (Influenza-like illness-ILI), Pneumonia, Severe pneumonia, Acute respiratory distress syndrome, Sepsis, Septic shock.[7] Common symptoms of COVID-19 in children are cough and fever. It is important to note that these symptoms may not always be present; thus, a high index of suspicion for SARS-CoV-2 infection is required in children.[8] Most cases in children are mild, and treatment consists of supportive care.

Clinical manifestations of children with COVID-19 differ widely from adult cases. Fever and respiratory symptoms should not be considered a hallmark of COVID-19 in children.[10] Despite the worldwide spread clinical patterns of COVID-19 remain largely unclear among children. A few cases series and meta-analysis is published recently.[10-14] However, data from Bangladesh are

very limited.[15] Facing this unknown and emerging pathogen, we have designed this study with an aim to describe the clinical presentation, laboratory findings and post-COVID complaints of a cohort of pediatric patients with confirmed COVID-19 disease using data collected through face-to-face interview at a tertiary care facility in Chattogram district, Bangladesh.

Several studies are conducted in different countries of the world to determine the predictors of severe disease or admission to an Intensive Care Unit (ICU).[6,11] Most children with COVID-19 had a household contact and presented with asymptomatic or mild illness. Severe and critical illness were observed in young infants and those with comorbidities.[12-14] Ghosh et al reported that COVID-19 in Bangladeshi children is found with a variety of clinical presentations, unlike that of the adult.[15]

Under this circumstance, the aim of this study is to evaluate the clinical profile of RT-PCR positive paediatric patients with COVID-19 in Chattogram region. Such profile might facilitate the caregivers for early suspicion and identification of coronavirus infection to minimize morbidity, mortality & community transmission among children.

Materials and methods

This cross-sectional study was conducted in Paediatric Outpatient Department of Chittagong Medical College Hospital, Chattogram. All RT-PCR positive COVID paediatric patients reported by Microbiology Department of CMCH were enrolled in the study. The study was carried out from August 2021 to January 2022. According to inclusion/exclusion criteria, 96 RT-PCR positive paediatric patients of COVID-19 were taken as sample by convenient sampling for this study. The diagnosis of COVID-19 infection was confirmed by RT-PCR report of nasopharyngeal or oro-pharyngeal swab. Patients' guardians were contacted over telephone to attend paediatric OPD of CMCH for documentation of clinical informations & laboratory findings. In paediatric OPD, detailed clinical history of COVID-19 episode including post-COVID complaints were recorded from individual interviews through a pre-designed questionnaire .Findings of available investigations were also noted. The children were

thoroughly examined physically. After collection, data was checked, verified and edited as per specific objectives and key variables. Data analysis was done with SPSS (Statistical Package for Social Science), Ver. 25 and by using the MS Excel.

To conduct this study written permission was taken from ERC of CMCH. Following WHO and BMRC guidelines informed consent were taken from the guardians before the interview.

Results

All RT-PCR positive COVID paediatric patients were enrolled as study population. Among them 96 patients were eligible. 68.8% of the eligible children were in >5 years, 18.8% were in 1-5 years, and 12.4% were in the <1 year age group. 55.2% were female and 48.8% were male patients. 68.8% patients came from rural area and 31.2% were urban resident. 49% children were from lower-middle income family and 39.6% belonged to upper-middle income family (Table I). 66 (80%) patients had history of contact with suspected or confirmed COVID-19 patient (Figure 1). Among 96 children, 21 patients were hospitalized during their illness.. The time from symptom onset to hospital admission was ranged from 1-8 days. Mean ± SD time from symptom onset to hospital admission was 4.76 ± 1.998 days (Figure 2). Figure 3 shows, among 21 admitted patients, duration of hospital stay was ranged from 4-14 days. Mean ± SD duration of hospital stay was 6.1 ± 2.385 days. Table II shows, maximum (97.9%) patients had fever, 77.1% patients had cough and 29.2% patients had vomiting. 28.1% children reported alteration of smell while 15.6% had alteration of taste. Both sore throat and dyspnoea were found among 21.9% of the patients.

Table III shows median (IQR) temperature of the patients was 101º F (100-102) (Range: 99-105) and SPO2 was 95.5% (90%-98%) (Range: 84%-100%). Majority (82.3%) of the patients had no co-morbidities. 9.4% had asthma, 5.2% had TB, 2.1% had epilepsy and only 1% patient had congenital heart disease (CHD). Table IV shows available investigation profile of the patients. Mean ± SD Hb% (g/dl) was 12.04 ± 1.817 g/dl and range: 7-16 g/dl; median (IQR) WBC (/Cumm) was 9500 (7200-16000) (Range: 3200-26000), median (IQR) Neutrophil (%) was 64 (54-71)

(Range: 14-90), median (IQR) Lymphocyte (%) was 28 (22-36) (Range: 6-74) and median (IQR) Platelet count (/Cumm) was 200000 (172500-284000) (Range: 40000-418000). Raised CRP, D-Dimer and S. Ferritin level were found among 43 (75.4%), 8 (14.4%) and 38 (66.7%) patients respectively. CXR findings of 47 patients showed that, 21 (45%) had patchy opacity, 19 (40%) had no significant abnormality and 6 (13%) had bilateral consolidation (Figure 4).

Table V shows, paracetamol was the most frequently (83.2%) used drug for this infection. Oral antibiotic was used in 64.2% children, bronchodilator and zinc supplementation were given to 48.4% and 43.2% children respectively Montelukast, antihistamine and steroid were used among 33.7%, 29.5% and 7.4% patients respectively. Oxygen therapy was needed for 12.6% children. .57.7% of the patients reported to feel fatigue after COVID 19 infection. About 40.4% patients had shortness of breath, 38.5% patients had history of weight loss. And 25% patients had lost their taste/smell. (Table VI).

Table I Socio-demographic characteristics of the Participants (n=96)

Variables	Level	Frequency (Percentage).
Age (Years)	<1	12 (12.4)
	1-5	18 (18.8)
	>5	66 (68.8)
Gender	Male	43 (48.8)
	Female	53 (55.2)
Residence	Rural	66 (68.8)
	Urban	30 (31.2)
Income per month (Tk.)	Low	10 (10.4)
	Lower Middle	47 (49)
	Upper Middle	38 (39.6)
	High	1 (1)

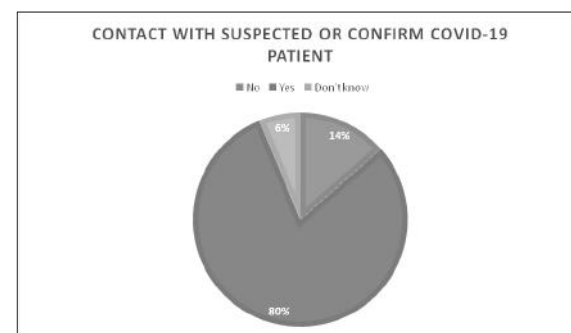Data are expressed as frequency (Percentage).

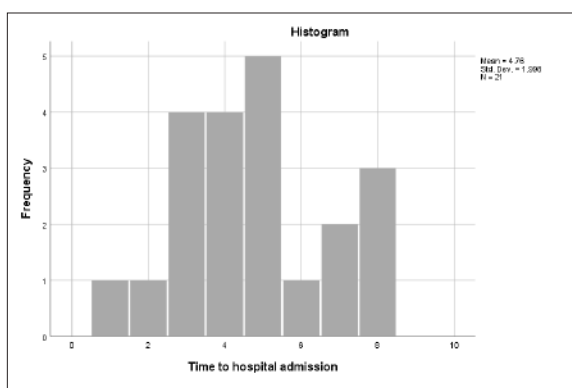**Figure 1** Contact with suspected or confirmed COVID-19 patient (n=96)

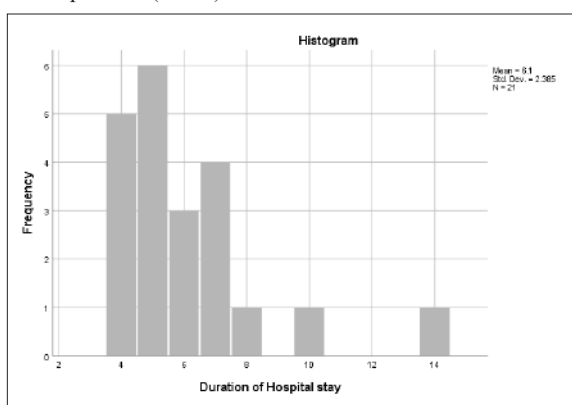**Figure 2** Time from symptom onset to hospital admission of the patients (n= 21)

Figure 3 Duration of hospital stay of the admitted children (n= 21)

Table II Clinical presentation during COVID-19 infection of the patients

Clinical presentations	Frequency	Percent of cases
Fever	94	97.9%
Cough	74	77.1%
Sore throat	21	21.9%
Dyspnoea	21	21.9%
Nausea	10	10.4%
Vomiting	28	29.2%
Diarrhoea	17	17.7%
Muscle ache	10	10.4%
Head ache	15	15.6%
Abdominal pain	19	19.8%
Nasal congestion	22	22.9%
Altered sense of smell	27	28.1%
Altered sense of taste	15	15.6%
Conjunctivitis	3	3.1%
Others	2	2.1%

Data are expressed as frequency (Percent of cases), Multiple response variable.

Table III Physical examination findings and co-morbidities (n=49)

Variables		
Temperature (ºF)	Median (IQR)	101 (100-102)
	Range	99-105
SPO$_2$ (%)	Median (IQR)	95.5 (90-98)
	Range	84-100
		n (%)
Co-morbidities	No	79 (82.3%)
	CHD	1 (1%)
	Epilepsy	2 (2.1%)
	TB	5 (5.2%)
	Asthma	9 (9.4%)

Data are expressed as median (IQR) and frequency (Percentage)

Table IV Investigation profile of the study patients (n=57)

Variables		
Hb% (g/dl)	Mean ± SD	12.04 ± 1.817
	Range	7-16
WBC (/Cumm)	Median (IQR)	9500 (7200-16000)
	Range	3200-26000
Neutrophil (%)	Median (IQR)	64 (54-71)
	Range	14-90
Lymphocyte (%)	Median (IQR)	28 (22-36)
	Range	6-74
Platelet count (/Cumm)	Median (IQR)	200000 (172500-284000)
	Range	40000-418000
CRP	Raised	43 (75.4%)
D-Dimer	Raised	8 (14.4%)
S. Ferritin	Raised	38 (66.7%)

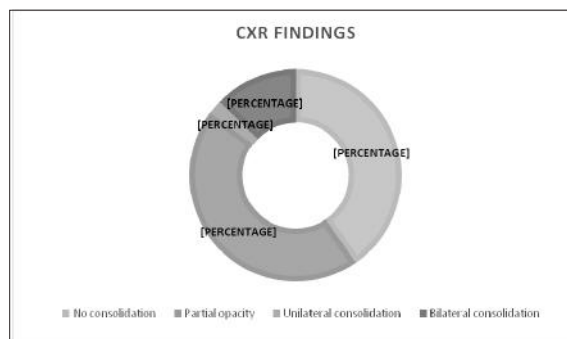Data are expressed as mean ± SD/ median (IQR) and range

Figure 4 Chest X-ray findings of the patients (n= 47)

Table V Treatment history for COVID-19 infection of the patients

Names	Frequency	Percent of cases
Oral antibiotic	61	64.2%
Bronchodilator	46	48.4%
Paracetamol	79	83.2%
Steroid	7	7.4%
Antihistamine	28	29.5%
Montelukast	32	33.7%
Zinc	41	43.2%
Others	31	32.6%
Oxygen therapy	61	12.6%

Data are expressed as frequency (Percent of cases), Multiple response variable.

Table VI Post-COVID complaints among the patients

Clinical complaint	Frequency	Percent of cases
Fatigue	30	57.7%
Extreme weakness	7	13.5%
Palpitation	10	19.2%
Shortness of breath	21	40.4%
Psychological problems	4	7.7%
Weight loss	20	38.5%
Loss of taste/smell	13	25.0%
Bowel disturbance	8	15.4%

Data are expressed as frequency (Percent of cases), Multiple response variable.

Discussion

Novel Coronavirus disease 2019 (COVID-19) in children is asymptomatic or mild in majority; however, critical illnesses are observed in small proportion.[16,17] Despite the worldwide spread, the epidemiological and clinical patterns of the COVID-19 remain largely unclear, particularly among children. Since the virus is novel and there exists a lot of heterogeneity in the spectrum and severity of illness across age groups globally, it is pertinent to study and identify the clinical profile and outcome of these patients. The objective of the study was to evaluate the clinical profile of RT-PCR- positive paediatric patients with COVID-19 in Chattogram region. According to the objective, the study was carried out among 96 RT-PCR positive children of COVID-19 in Chattogram region.

An overview of the RT-PCR positive paediatric patients with COVID-19 in this study reflected the socio-demographic characteristics of such patients. Age range was between <1 to >5 years; and was categorized into three subgroups. 68.8% children were in >5 years, 18.8% were in 1-5 years, and 12.4% were in the <1 year age group. Ahsan et al showed that, according to age distribution, 0-30 days aged 26 patients, 1-12 month aged 57 patients, 1-5 years aged patients, 5-10 years aged 42 patients, more than 10 years and less than 18 years aged 14 patients were admitted.[18] Similarly, Sultana et al found that, newborn (0-28 days) was 3 (6%), 1 month to 1 year was 5 (10%), 1 year-2 year was 5 (10%), 2 year-5 year was 15 (30%), 5 year-10 year was 17 (34%) and 10 year-12 year was 6 (12%) children [19]. Another study by Anwar et al described that, the distribution of age group shows that maximum patients (30.6%) were in the group of 11-15 years.[20]

Regarding gender, 55.2% were female and 48.8% were male. Similarly, Sultana et al found that 48% were male and 52% were female.[19] Another study by Khondaker et al showed that male female ratio was 1:1.2.[21] In their study by Ahsan et al revealed, among 196 COVID 19 confirmed cases, most of them were male :116.[18] 68.8% of the patients in the present study were from rural area and 31.2% were urban resident.49% belonged to lower-middle income family and 39.6% were from upper-middle income family (Table I).

66 (80%) children had history of contact with suspected or confirmed COVID-19 patient (Figure-1). Singh et al. (2021) found 12 (12%) children had history of contact with SARS-CoV-2 patients.[22]

Among 96 study children, 21 patients got hospitalized for their illness. The time from symptom onset to hospital admission ranged from 1-8 days. Mean ± SD time from symptom onset to hospital admission was 4.76 ± 1.998 days (Figure 2). Singh et al showed that, Median (IQR) time from symptom onset to hospitalization was 4 (2,7) days and mean ± SD time from symptom onset to hospital admission was 6.42 ± 6.81 days.[22]

Figure 3 shows the duration of hospital stay among 21 admitted patients ranged from 4-14 days. Mean ± SD duration of hospital stay was 6.1 ± 2.385 days. Sultana et al. (2021) found, 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 $10.96 \pm .18$ days.[19] Singh et al revealed that, mean ±SD/Median (IQR) length of hospital stay was $8.95 \pm 7.77/$ 7 (4,13) days respectively.[22]

In present study, maximum (97.9%) patients had fever. ,77.1% patients had cough and 29.2% patients had vomiting. 28.1% patients had alteration of smell and 15.6% had alteration of taste. Both sore throat and dyspnoea were present among 21.9% of the patients. Table III shows median (IQR) temperature of the patients was 101º F (100-102) (Range: 99-105) and SPO_2 was 95.5% (90%-98%) (Range: 84%-100%). In their study by Anwar et al showed fever, nasal congestion, cough, myalgia, leukopenia/lymphopenia were very common and maximum patients had these.[20] Sultana et al found, 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%).[19] Ahsan et al shows, among 196 COVID-19 patients, most patients came with fever (110), Upper Respiratory Tract Infection (URTS) in 74 patients, Lower Respiratory Tract Infection (LRTS) in 68 patients, myalgia in 63 patients, diarrhea in 41 patients, headache in 33 patients, rash in 27 patients, conjunctivitis in 5 patients and 36 patients came with different surgical emergencies.[18]

Majority (82.3%) of the patients had no co-morbidities. About 9.4% had asthma, 5.2% had TB, 2.1% had epilepsy and only 1% patient had CHD. Sultana et al found 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.[19] Singh et al revealed that more than half (59%) of the patients admitted with SARS CoV-2 had underlying comorbid illness. Tuberculosis and hematological malignancy were the most commonly observed comorbidity in these children.[22]

Table IV shows investigation profile of the patients. Mean ± SD Hb% (g/dl) was 12.04 ± 1.817 g/dl and range: 7-16 g/dl; median (IQR) WBC (/Cumm) was 9500 (7200-16000) (range: 3200-26000), median (IQR) Neutrophil (%) was 64 (54-71) (Range: 14-90), median (IQR) Lymphocyte (%) was 28 (22-36) (Range: 6-74) and median (IQR) Platelet count (/Cumm) was 200000 (172500-284000) (Range: 40000-418000). Raised CRP, D-Dimer and S. Ferritin level was found among 43 (75.4%), 8 (14.4%) and 38 (66.7%) patients respectively. Sultana et al showed, 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. 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±13% and 52.5±13% respectively. Seven (14%) cases had positive CRP. 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 μg/ml and forty (80%) cases had high S. LDH. Only three (6%) cases had a high S. ferritin.

Available CXR findings of 47 patients shows that, 21 (45%) had partial opacity, 19 (40%) had no significant abnormality and 6 (13%) had bilateral consolidation (Figure 4). In their study by Anwar et al. (2021), CXR findings showed, ground-glass opacity among 22 (2.1%), local patchy shadowing among 388 (38%), bilateral patchy shadowing among 325 (31.8%) and interstitial abnormalities among 285 (27.9%) patients.[20] Khondaker et al described that, a total of 6 (23%) of the study patients had an abnormality in the chest X-ray either pneumonia or pneumonia with pleural effusion.[21]

Table V shows, paracetamol was the mostl frequently (83.2%) used drug for this infection. Oral antibiotic 64.2%, bronchodilator 48.4% patients and zinc supplementation (43.2%) were also prescribed. Montelukast, antihistamine and steroid were used in 33.7%, 29.5% and 7.4% patients respectively. Oxygen therapy was needed for 12.6% children. A study by Singh et al described that, Oxygen therapy was needed among 54%, Mechanical ventilation was needed among 35% and Renal replacement therapy was needed among 3% patients.[22]

Present study revealed that, 57.7% patients felt fatigue after the clinical illness. 40.4% patients had shortness of breath, 38.5% patients had history of weight loss while 25% patients had lost their taste/smell (Table VI). Regarding complications, Singh et al. (2021) reported that 18% had acute respiratory distress syndrome, 15% had Encephalopathy, 9% had Myocarditis, 19% had Transaminitis and 16% had acute kidney injury.[22]

Limitations

This study conducted among RT-PCR positive children whose guardians were approached initially through telephone and thus the response for willingful participation was not satisfactory.

The sample size was small. As the study has been done only among children of Chattogram region, it does not reflect the national figure.

Conclusion

The RT-PCR positive COVID-19 cases in the pediatric population were represented in this report. Clinical profile of COVID 19 in children was mild and the outcome was good: Clinical presentations of COVID-19 in children were mild. Fever and cough were found to be the predominant symptoms of COVID-19 affected children in this study. Vomiting, nasal congestion and altered smell were also typical symptoms. Raised CRP and S. Ferritin level were two important laboratory findings

Recommendation

Further studies may be done to explore this field of interest more elaborately.

Contribution of authors

1. ZC-Conception, design, acquisition of data, data analysis, manuscript writing and final approval.
2. AKD-Acquisition of data, critical revision and final approval.
3. SH-Acquisition of data, interpretation of data, drafting and final approval.
4. SC-Interpretation of data, critical revision and final approval.
5. HMH-Data analysis, interpretation of data, drafting and final approval.

Disclosure

All the authors declared no competing interest.

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