Demographic data and risk factors for pneumonia in children with COVID-19.

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ABSTRACT

Background: Children had been globally affected by Coronavirus disease 2019 (COVID-19) since the first outbreak in 2019 with a rapidly increasing rate of infection in 2021. Data of children with COVID-19 infection in Thailand was limited.

Purpose: This study aimed to present the demographic data and identify the risk factors of developing pneumonia in children with COVID-19.

Methods: This retrospective study was conducted using the medical records of children aged less than 15 years, who were diagnosed with COVID-19 from May 1, 2021, to August 31, 2021.

Results: Four hundred and four children with the median age of 8 years were included in this study. Symptomatic infection was accounted for in 71% of the participants. Cough was the most common presenting symptom (23.3%). Pneumonia was diagnosed in 37.8% of the children. Ground-glass opacity and perihilar infiltration were the two most common abnormal radiographic findings (49% and 35%, respectively). Children younger than five years old were found to be associated with the development of pneumonia (adjusted odds ratios: 2.17, 95% confidence interval: 1.42 - 3.32; $p < 0.001$).

Conclusion: Substantial numbers of children within this cohort were symptomatic with approximately one-third of children developing pneumonia. Young children especially those younger than 5 years were more likely to develop pneumonia.

Keywords: Coronavirus disease 2019 (COVID-19), SARS-CoV2, Pneumonia, Children, Risk factors.

INTRODUCTION

In the past two decades, Coronaviruses had been the leading cause of severe respiratory illness starting from the Severe Acute Respiratory Syndrome-related Coronavirus (SARS-CoV) in the year 2002-2003 to the Middle East Respiratory Coronavirus (MERS-CoV) in the year 2012. The mortality rate from MERS-CoV was astonishingly high at 35%.[1,2,3] In late 2019, there had been another major outbreak of viral pneumonia from Coronavirus in Wuhan, China known as the severe acute respiratory syndrome Coronavirus 2 (SARS-CoV2) or Coronavirus disease 2019 (COVID-19). Data from WHO Coronavirus (COVID-19) Dashboard in December 2021 showed that SARS-CoV2 had then become a major cause of pandemic affecting more than 280 million people and led to more than 5 million deaths. [4]

The infection rate had been rapidly increasing in 2021 due to the increased capability of transmission of the variant of concerns such as the Alpha and the Delta variants of SARS-CoV2. The rates of transmission of the variants were as high as 22% when compared to the transmission rate of 2% of the original variants.[5,6] With the increasing number of infections in adults, children became more susceptible to the transmission and the development of COVID-19 infection due

to the low rate of vaccination in children and the close contact with infected family members during the era of the variant of concerns.[7]

Since COVID-19 is a newly emerging disease, the ethnicity and the area of infection might affect the course of the disease. The current data of pediatric infection were mostly reported from China, the USA, Europe, and India with only a few studies from South East Asian (SEA) countries.[8] Moreover, most studies were conducted in 2020, which failed to incorporate the variants of concern. This study aimed to describe the demographical data of children with COVID-19 infection in the era of the variants of concern and to evaluate the risk factors that were associated with the development of pneumonia. To our knowledge, this is one of the few first studies of pediatric COVID-19 infection in the Thailand in the era of variants of concerns.

METHODS

Study design

The study was conducted by a retrospective chart review of the medical records of all children aged less than 15 years old who were admitted to Lerdsin Hospital COVID-19 care system service from May 1, 2021, to August 31, 2021. Lerdsin Hospital is a tertiary care public hospital with a monthly admission of 300 children. All included children had a confirmed diagnosis of COVID-19 using real-time reverse transcriptase-polymerase chain reaction assay (RT-PCR) methods. Patients with incomplete data and children with perinatal infection were excluded from the analysis. This study was approved by the Ethics Committee of Lerdsin Hospital (LH641062). Informed consent was obtained accordingly from the participants.

Lerdsin Hospital COVID-19 care system service

In March 2021, there was a third wave of COVID-19 outbreaks in Thailand. The Ministry of Public Health (MOPH) of Thailand had set the national policy that all patients need to be admitted to the hospital. The aim of this strategy was designed to prevent further spreading of the disease in the communities, which might alleviate the numbers of patients progressing to severe diseases by early evaluation and treatment. Thus, to adhere to the national policy, Lerdsin Hospital COVID-19 care system service was divided into the hospital and the hospitel services (field hospital) to increase the care capacities for the infected patients.

Hospitel service

Hospitel service is a field hospital that was set up in a hotel and was supervised by medical personnel, including doctors, nurses, and pharmacists. This extended medical service had a capacity of 600 beds. Prior to the admission, all pediatric patients were screened by the nurses and the pediatric infectious diseases specialist or the pediatric pulmonologist using the specified criteria to assign the site of admission. Patients who were at high risk for clinical deterioration or children requiring oxygen support were all admitted to the hospital. Children who were asymptomatic or had only mild clinical symptoms were admitted to the hospitel service. Clinical follow-up and evaluation by a phone call from nurses and doctors with temperature and oxygen saturation monitoring was performed at least twice per day. Chest radiography was performed in every child on day 1 and day 3-5 of the admission as a protocol of both the hospital and the hospitel. Any patients who needed closed monitoring or oxygen supplementation were transferred to the hospital service and stable pediatric patients can be transferred from the hospital to the hospitel service to complete a 14 days isolation period according to national guidelines.

Data collection

Data collection in this study included demographical data such as age, gender, underlying diseases, body weight, and height. Symptoms of the patient were reviewed and recorded as fever, coryza, cough, dyspnea, anosmia, and gastrointestinal symptoms. COVID-19 results were recorded to confirm the diagnosis. Pneumonia was defined as a condition including fever, abnormal respiratory symptoms, or the presence of abnormal chest radiography defined by COVID-19 CO-RADS classification. [9] All

chest radiography results were reported by the radiologists. Overweight was defined as the median weight for height more than 2 standard deviations (SD) according to the WHO definition [10] by using the median weight for height value for Thai children. [11]

Treatment data recorded include antiviral drugs, corticosteroids, antibiotic administration, and the type of respiratory support. The definition of the clinical spectrum of COVID-19 infection was defined according to the National Institute of Health (NIH) as asymptomatic infection, mild illness, moderate illness, severe illness, and critical illness. (Table 1)[12]

Table 1. Clinical spectrums of SARS-CoV-2 infection [12]

Clinical spectrum	Details
Asymptomatic or presymptomatic infection	Individuals who tested positive for SARS-CoV-2 but have no symptoms that are consistent with COVID-19.
Mild illness	Individuals who tested positive for SARS-CoV-2 with signs and symptoms of respiratory tract infection or gastrointestinal symptoms without the evidence of lower respiratory disease.
Moderate illness	Individuals who showed evidence of lower respiratory disease during clinical assessment or imaging with the oxygen saturation (SpO2) ≥94% on room air at sea level.
Severe illness	Individuals who have SpO2 <94% on room air at sea level, a ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO2/FiO2) <300 mm Hg or lung infiltrates of >50%.
Critical illness	Individuals who have respiratory failure, septic shock, and/or multiple organ dysfunction.

Data analysis

SPSS version 24 (IBM Corporation, Armonk, New York) was used for the data analysis. Descriptive statistical analyses were used for the demographic data. Percentage, median, interquartile range, and Chi-square were used where appropriate. Univariate and multivariate logistic regressions were performed to evaluate the risk factors of COVID-19 pneumonia in pediatric patients.

RESULTS

Demographic data

A total of 410 children with confirmed COVID-19 infection by RT-PCR were admitted to Lerdsin Hospital COVID-19 care system during the study period. Five children were excluded due to incomplete data and one child had a perinatal infection, thus 404 children were included for the final analysis. Sixty-four patients (15.8%) were admitted to the hospital, whilst the remaining 340 patients (84.2%) were admitted to the hospitel service. Two hundred-six children (50.9%) were male. The median age was 8.0 years old (interquartile range (IQR) = 3.0 – 11.0 years old) with the youngest patient being only 7 days old who contracted COVID-19 from the family members after being discharged from the post-partum care at the hospital. Underlying conditions were identified in 48 patients (11.8%). Asthma was the most common pre-existing condition among patients with underlying diseases. A total of 65 children (16%) were found to have the median weight for height greater than 2 SD.

Clinical characteristics and severity of pediatric COVID-19 infection

Approximately 71.3% of the patients in this study exhibited clinical symptoms. The three most common symptoms were cough (23.3%), coryza (18.9%), and fever (13.8%). According to the NIH clinical spectrum of COVID-19 infection classification, most children in this cohort were classified as having a mild illness (169 children; 41.8%) and moderate illness (147 children; 36.4%). Four patients (1%) had severe illnesses requiring oxygen cannula, and two patients (0.5%) had critical illnesses requiring mechanical ventilation. All six patients (1.5%) received systemic steroids. One critically ill patient was diagnosed with Down's syndrome, and another critically ill patient had morbid obesity.

A total of 194 children (48.8%) received antiviral medications per national guidelines. Eight patients (2.0%) received empirical intravenous antibiotics due to suspected bacterial infection. Three patients were given antibiotics due to the progression of pneumonia, the other three patients

for late neonatal sepsis, one got antibiotics due to high-grade fever with diarrhea and the last child had lymphadenitis on day 12 of illness. No mortality was found. The demographic data, clinical characteristics, and the treatments of the patients were summarized in Table 2.

Table 2. Demographic data of pediatric COVID-19 patients

Characteristics	Total (N = 404)	Hospital admission (N=64)	Hospitel admission (N=340)	P-value
Age, median (years; IQR) *	8.0 (3.0-11.0)	4.1 (0.5-8.0)	8.7 (4.1-11.0)	< 0.001
Age group (N; %) *				< 0.001
Age less than 1 years	63 (15.6)	33 (51.5)	30 (8.8)	
Age 1-5 years	83 (20.5)	10 (15.6)	73 (21.5)	
Age 5-10 years	142 (35.1)	11 (17.3)	131 (38.5)	
Age 10-15 years	116 (28.7)	10 (15.6)	106 (31.2)	
Gender (N; %)				0.656
Male	206 (50.9)	31 (48.4)	175 (51.5)	
Female	198 (49.1)	33 (51.6)	165 (48.5)	
Underlying diseases (N; %)	48 (11.9)	10 (15.6)	38 (11.2)	0.287
Allergic rhinitis	9 (2.2)	1 (1.6)	8 (2.4)	
Asthma	16 (4.0)	3 (4.6)	13 (3.8)	
Thalassemia disease	8 (2.0)	0 (0)	8 (2.4)	
Malignancy	2 (0.5)	1 (1.6)	1 (0.3)	
Congenital heart diseases	3 (0.7)	1 (1.6)	2 (0.6)	
Others**	10 (2.5)	4 (6.2)	6 (1.7)	
Nutritional status (N; %)				0.537
Wasted (%W/H < -2SD)	44 (10.9)	5 (7.8)	39 (11.5)	
Normal (%W/H between -2 to +2SD)	295 (73.1)	49 (70.4)	246 (72.3)	
Overweight (% W/H between +2 to + 3SD)	30 (7.3)	6 (9.4)	24 (7.1)	
Obese (% W/H > + 3SD)	35 (8.7)	4 (6.2)	31 (9.1)	
Details of COVID-19 symptoms (N; %)*				<0.001
Asymptomatic	116 (28.7)	6 (9.4)	110 (32.4)	
Fever	56 (13.8)	15 (23.4)	41 (12.1)	
Coryza	76 (18.9)	10 (15.6)	66 (19.4)	
Cough	94 (23.3)	17 (26.6)	77 (22.6)	
Gastrointestinal symptoms	31 (7.7)	13 (20.3)	18 (5.3)	
Anosmia	15 (3.8)	0 (0.0)	15 (4.4)	
Dyspnea	2 (0.6)	2 (3.1)	0 (0.0)	
Chest tightness	3 (0.7)	1 (1.6)	3 (0.9)	
Headache	2 (0.6)	0 (0.0)	2 (0.5)	
Rash	8 (1.9)	0 (0.0)	8 (2.4)	
Disease severity (N; %) *				<0.001
Asymptomatic	82 (20.3)	3 (4.7)	79 (23.3)	
Mild illness	169 (41.8)	31 (48.4)	138 (40.5)	
Moderate illness	147 (36.4)	24 (37.5)	123 (36.2)	
Severe illness	4 (1.0)	4 (6.3)	0 (0)	
Critical illness	2 (0.5)	2 (3.1)	0 (0)	
Treatment (N; %)*				
Antiviral drugs (Favipiravir)	194 (48.8)	51 (79.7)	147 (43.2)	< 0.001
Systemic corticosteroids	6 (1.5)	6 (9.4)	0 (0)	< 0.001
Intravenous antibiotics	8 (2.0)	8 (12.5)	0 (0)	< 0.001
Oxygen cannula	4 (1.0)	4 (6.3)	0 (0)	0.001
Mechanical ventilator	2 (0.5)	2 (3.1)	0 (0)	0.001

W/H = weight for height, CI – confidence interval, OR = odds ratio

*$p < 0.05$

***Others included attention deficit hyperactivity disorders, autistic spectrum disorders, genetic conditions.*

Comparison of clinical characteristics of patients in hospital and hospitel service (Table 2)

Children admitted to the hospital were significantly younger than the children being admitted to the hospitel service with the median age of 4 years old (IQR = 0.5-8.0) and 8.7 years old (IQR = 4.1-11.0), respectively ($p < 0.001$). There was a significantly higher proportion of symptomatic patients in the hospital compared with the hospitel service (90.6% VS 67.6%; $p < 0.001$). Common symptoms of the hospitalized patients were cough (26.6%), fever (23.4%), and gastrointestinal symptoms (20.3%). The severity of the diseases was significantly different among groups with greater severity in the hospital group ($p < 0.001$). Hospitalized patients were more likely to be prescribed antiviral medication (79.5 % VS 43.2%; $p < 0.001$). All patients who need systemic corticosteroids, antibiotics, oxygen

supplements, and mechanical ventilation were closely observed in the hospital. There were no significant differences in gender, underlying diseases, and nutritional statuses among groups (Table 2).

Comparison of clinical characteristics of patients with and without pneumonia

The diagnosis of pneumonia was made in 153 patients (37.8%) from clinical signs and symptoms of pneumonia or abnormal chest radiography. Radiographic findings of patients with pneumonia were ground-glass opacity (49%), perihilar infiltration (35%), and interstitial infiltration (10%) (Figure 1). The location of the abnormal infiltration was on the right side in 43.8%, bilateral infiltration in 43.1%, and the left side in 13.1%.

Patients with pneumonia were significantly younger than patients without pneumonia (7.0 years old (IQR 2.0 – 7.0) VS 7.8 years old (IQR 4.0 – 11.0), p = 0.016). There were a significantly higher proportion of children younger than 5 years of age developing pneumonia when compared to older children (46.4% VS 29.8%; p = 0.001). All patient who was diagnosed with pneumonia received Favipiravir according to the national treatment guideline. There were no statistically significant differences in the proportion of patients with or without pneumonia in terms of gender, underlying diseases, nutritional status, and detail of symptoms. The data comparing patients with and without pneumonia were outlined in Table 3.

Table 3. Demographic data in patients with and without pneumonia

Characteristics	Pneumonia group (N=153)	Without pneumonia group (N=251)	P-value
Age, median (years; IQR) *	7.0 (2.0-7.0)	7.8 (4.0-11.0)	0.016
Age less than 5 years (N; %) *	71 (46.4)	75 (29.8)	0.001
Gender (N; %)			0.150
Male	71 (46.4)	135 (53.8)	
Female	82 (53.6)	116 (46.2)	
Underlying diseases (N; %)	25 (16.3)	23 (9.2)	0.430
Allergic rhinitis	2 (1.3)	7 (2.8)	
Asthma	9 (5.9)	7 (2.8)	
Thalassemia disease	4 (2.6)	4 (1.6)	
Malignancy	1 (0.6)	1 (0.4)	
Congenital heart diseases	2 (1.3)	1 (0.4)	
Others**	7 (4.6)	3 (1.2)	
Nutritional status (N; %)			0.057
Wasted (%W/H < -2SD)	13 (8.4)	31 (12.4)	
Normal (%W/H between -2 to + 2SD)	109 (71.7)	186 (74.1)	
Overweight (% W/H between +2 to + 3SD)	17 (10.9)	13 (5.2)	
Obese (% W/H > + 3SD)	14 (9.0)	21 (8.3)	
Details of COVID-19 symptoms (N; %)			0.330
Asymptomatic	34 (22.3)	82 (32.7)	
Cough	38 (24.8)	56 (22.3)	
Coryza	28 (18.4)	48 (19.1)	
Fever	26 (17.0)	30 (12.0)	
Gastrointestinal symptoms	14 (9.1)	17 (6.8)	
Anosmia	6 (3.9)	9 (3.5)	
Rash	4 (2.6)	4 (1.6)	
Dyspnea	2 (1.3)	0 (0)	
Chest tightness	1 (0.6)	3 (1.2)	
Headache	0 (0)	2 (0.8)	
Treatment (N; %)			
Antiviral drugs (Favipiravir)	144 (94.1)	50 (19.9)	< 0.001
Systemic corticosteroids	6 (2.6)	0 (0.0)	< 0.001
Intravenous antibiotics	8 (5.2)	0 (0.0)	< 0.001
Oxygen supplement	6 (3.9)	0 (0.0)	0.001
Mechanical ventilator	2 (1.3)	0 (0.0)	0.001

W/H = weight for height, CI – confidence interval, OR = odds ratio
*p < 0.05
**Others included attention deficit hyperactivity disorders, autistic spectrum disorders, genetic conditions.

Analysis of the risk factors for pediatric covid-19 pneumonia

Patients younger than 5 years old were more likely to develop pneumonia when compared to children older than 5 years old with the crude odds ratios (OR) of 1.31 (95% confidence interval (CI): 1.11 – 1.55; p = 0.001)). After the adjustment for weight for height, gender, and underlying diseases, children younger than 5

years of age remained significantly associated with pneumonia (adjusted OR: 2.17, 95% CI: 1.42 – 3.32; $p < 0.001$). Weight for height greater than 2 standard deviations, gender, and underlying diseases was not associated with the development of pneumonia. (Table 4)

Table 4 Univariate and multivariate analysis for risk factors of pediatric COVID-19 pneumonia

Risk factors	Crude Odds ratio (95% CI)	P-value	Adjusted OR (95% CI)	P-value
% W/H > 2SD	1.62 (0.95-2.77)	0.075	1.72 (0.99-3.01)	0.053
Male sex	1.34 (0.89-2.01)	0.150	1.46 (0.96-2.21)	0.075
Underlying diseases	1.60 (0.87-2.93)	0.126	1.77 (0.95-3.30)	0.074
Age < 5 years old	1.31 (1.11-1.55)	0.001	2.17 (1.42-3.32)	<0.001

W/H = weight for height; CI = confidence interval; OR = odds ratio; SD = standard deviation
Adjusted for weight for height > 2SD, male gender, underlying diseases, and age < 5 years old

Comparison of clinical characteristics of patients according to age group

This cohort demonstrated significantly different nutritional statuses in children among groups. The proportion of children being classified as wasting was significantly higher in children younger than 5 years of age (17.1% VS 7.4%; p = 0.015). A group of younger children were more likely to develop pneumonia ($p = 0.001$) and had a higher severity of diseases when compared to the older counterparts. ($p < 0.001$). Furthermore, the symptoms of COVID-19 were also significantly different among groups with children younger than 5 years old exhibiting more symptoms ($p = 0.003$). The prescription of Favipiravir was significantly higher in younger children which coincided with higher severity (61.6% VS 40.3%; $p < 0.001$). Systemic steroid administration, oxygen supplementation, and mechanical ventilator utilization were comparable among groups. (Table 5)

Table 5 Comparison of demographic data in terms of age group.

Characteristics	Age < 5 years (N =146)	Age > 5 years (N = 258)	P-value
Gender (N; %)			0.747
Male	76 (52.0)	130 (50.4)	
Female	70 (48.0)	128 (49.6)	
Underlying diseases (N; %)			0.157
Allergic rhinitis	0 (0.0)	9 (3.5)	
Asthma	3 (2.1)	13 (5.0)	
Thalassemia disease	4 (2.7)	4 (1.6)	
Malignancy	0 (0.0)	2 (0.8)	
Congenital heart diseases	1 (0.7)	2 (0.8)	
Others**	4 (2.7)	6 (2.3)	
Nutritional status (N; %)			0.015
Wasted (%W/H < -2SD)	25 (17.1)	19 (7.4)	
Normal (%W/H between -2 to + 2SD)	99 (67.8)	196 (75.9)	
Overweight (% W/H between +2 to + 3SD)	9 (6.2)	21 (8.2)	
Obese (% W/H > + 3SD)	13 (8.9)	22 (8.5)	
Severity of diseases (N; %)			<0.001
Asymptomatic	16 (11.0)	64 (24.8)	
Mild illness	59 (40.4)	112 (43.4)	
Moderate illness	70 (47.9)	77 (29.8)	
Severe illness	0 (0)	4 (1.6)	
Critical illness	1 (0.7)	1 (0.4)	
Pneumonia (N; %)	71 (48.6)	82 (31.7)	0.001
Details of COVID-19 symptoms (N; %)			0.003
Asymptomatic	38 (26.0)	78 (30.2)	
Cough	30 (20.5)	64 (24.8)	
Coryza	27 (18.6)	49 (18.9)	
Fever	30 (20.5)	26 (10.1)	
Gastrointestinal symptoms	17 (11.6)	14 (5.4)	
Anosmia	0 (0.0)	15 (5.8)	
Rash	3 (2.0)	5 (1.9)	
Dyspnea	1 (0.8)	5 (1.9)	
Headache	0 (0.0)	2 (1.0)	
Treatment (N; %)			
Antiviral drugs (Favipiravir)	90 (61.6)	104 (40.3)	< 0.001
Systemic corticosteroids	1 (0.7)	5 (1.9)	0.317
Oxygen supplement	0 (0.0)	4 (1.6)	0.131
Mechanical ventilator	1 (0.7)	1 (0.4)	0.682

W/H = weight for height, CI – confidence interval, OR = odds ratio
*p < 0.05
**Others included attention deficit hyperactivity disorders, autistic spectrum disorders, genetic conditions.

Discussion

The rapid spreading of the Alpha and the Delta variants of COVID-19 occurred in January 2021 with the rising of cases in adults and children all around the world. Thailand had been severely affected by these variants of concern of COVID-19 in May 2021. Our study was one of the first few studies from this region that took place during the outbreak of the Alpha and the Delta variants, including a total of 404 pediatric patients with COVID-19 infection. The infection rates in children had been rising corresponding to the increasing numbers of infections in the family members. All patients in our cohort were diagnosed with COVID-19 using the RT-PCR method, which is a gold standard for the diagnosis of infection. We found that approximately 28.7% of the patients exhibited no clinical signs and symptoms of COVID-19 infections, which were similar to the previously reported studies with asymptomatic infection rates of 9 - 39.8%. [13,14,15] The ratio of the asymptomatic cases may be varied in the different studies due to the differences in the policy and strategies in terms of contact tracing.

The most common presenting symptoms in this cohort were cough (32.6%) and coryza (26.4%). Approximately 13.8% of the patients presented with isolated fever without any other symptoms. These similar results had been reported in the previous studies.[16,17] Furthermore, we also illustrated that the symptoms were not statistically different in children with or without pneumonia (p = 0.330). Interestingly, we had found that 34 children (22.3%) of patients who had the diagnosis of pneumonia from chest radiography had no symptoms. These had been previously reported in children.[18] Unlike the adult population, where abnormal chest radiography was often associated with clinical symptoms.[19] Similar to the previous studies, our study revealed that ground-glass opacities and perihilar infiltration were the most common abnormal radiographic findings with the majority of the abnormal lesions located on the right side. [21, 22]

Most children in this cohort had mild to moderate illness, which accounted for 78.7% of the population. Patients with severe to critical illness account for only 1.5% of the population which was in concordance with the previously reported studies. [18, 22]

From the current literature, there was a lack of evidence for the risk factors in the development of pneumonia in pediatric populations. [23, 24] In this cohort, we illustrated that children aged less than 5 years old were associated with the development of pneumonia when compared to older children (adjusted OR 2.17 (95% CI: 1.42-3.32); $p < 0.001$). These similar results were only reported in the study by Moreno-Noguez et al in Mexico, which indicated that the children aged 1-3 years were the risk factors for the development of pneumonia (OR, 2.64; 95%IC, 1.72-4.06, P<0.001)). Obesity had been an interesting risk factor for the development of pneumonia, though in our study, there was no statistical significance. Reports were revealing that children with obesity were more likely to develop pneumonia. [25] Failure to illustrate the association between obesity and pneumonia in our cohort might be due to the small numbers of the population with obesity.

Since COVID-19 is a newly emerging infectious disease, the guideline for the standard treatment varied among different countries. There were variations in the treatment, especially in the antiviral treatment. In Thailand, Favipiravir served as a primary antiviral treatment for the patients instead of Remdesivir due to the availability and with the national policy aim to alleviate the severe diseases from COVID-19. [13] Favipiravir is a purine nucleoside analog, which inhibits viral replication, and showed promising data in the in vitro study activity for COVID-19. [26] There had been a report on the utilization of Favipiravir for the pediatric patients with COVID-19 who had moderate disease with favorable results. [20] In our study, 43.2% of the patients received Favipiravir with no report of severe adverse effects.

Although our study is a retrospective study from a single center, our sample size was larger than other single-center studies in the same region. Nevertheless, some limitations must also be outlined. Since this was a retrospective study, some of the important information might be missed leading to the exclusion of the patients from the analytic cohort. Furthermore, we also believed that a larger sample size might be helpful in finding the risk factors of the development of COVID-pneumonia in children. These findings would aid in the development of the screening tool and plan for the management of the COVID-19 situation that might happen again in the future. At the time of conducting this study, vaccination for children were not available internationally, thus it was not possible to outline the effect of vaccination on the outcomes of COVID-19 in the children in our cohort. Further study is warranted to elucidate the effect of COVID-19 vaccination in children.

In conclusion, COVID-19 is a newly emerging infectious disease that affected both adults and pediatric populations. Although the severity of disease in children was usually mild to moderate even in the era of the variants of concern, still substantial numbers of children within this cohort were symptomatic with approximately one-third of children developing pneumonia. Young children especially those younger than 5 years were more likely to develop pneumonia. Thus, prudence must be taken in caring for younger than children with COVID-19.

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ข้อมูลกลุ่มประชากรและปัจจัยเสี่ยงของการพบภาวะปอดอักเสบในเด็กที่ติดเชื้อโควิด-19

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บทคัดย่อ

ความเป็นมา: นับตั้งแต่มีการระบาดของเชื้อโคโรนาไวรัส 2019 ในปี 2562 พบว่ามีการติดเชื้อในประชากรเด็กเพิ่มมากขึ้น โดยเฉพาะในปี 2564 ที่มีการติดเชื้อเพิ่มขึ้นอย่างมาก แต่กลับพบว่าข้อมูลเกี่ยวกับการติดเชื้อ COVID-19 ในเด็กของประเทศไทยนั้นยังมีอยู่อย่างจำกัด

วัตถุประสงค์: เพื่อนำเสนอข้อมูลพื้นฐานของเด็กที่ติดเชื้อโควิด-19 และประเมินปัจจัยเสี่ยงที่มีผลต่อการเกิดปอดอักเสบจากเชื้อโควิด-19

วิธีการศึกษา: การศึกษาแบบเก็บข้อมูลย้อนหลังโดยการทบทวนเวชระเบียนของเด็กที่อายุน้อยกว่า 15 ปีที่ได้รับการวินิจฉัยว่ามีการติดเชื้อโควิด-19 ตั้งแต่วันที่ 1 พฤษภาคม ถึงวันที่ 31 สิงหาคม 2564

ผลการศึกษา: พบว่ามีเด็กที่ติดเชื้อโควิด-19 ในระยะเวลาที่ทำการศึกษาทั้งหมด 404 ราย ค่ามัธยฐานของอายุ คือ 8 ปี พบว่าเป็นกลุ่มที่ติดเชื้อแบบมีอาการร้อยละ 71 อาการนำที่พบบ่อยที่สุดคือ อาการไอ พบร้อยละ 23.3 และพบว่ามีการวินิจฉัยภาวะปอดอักเสบร้อยละ 37.8 ความผิดปกติส่วนใหญ่ที่พบจากภาพรังสีทางทรวงอก ได้แก่ ground glass opacity (ร้อยละ 49) และ perihilar infiltration (ร้อยละ 35) โดยพบว่าเด็กที่มีอายุน้อยกว่า 5 ปีความเสี่ยงในการเกิดปอดอักเสบเพิ่มขึ้น 2.17 เท่า (adjusted odds ratios: 2.17, 95% confidence interval: 1.42 - 3.32; $p < 0.001$)

สรุป: พบว่าส่วนใหญ่เด็กที่ติดเชื้อโควิด-19 จะมีอาการและพบว่ามีปอดติดเชื้อได้ 1 ใน 3 โดยเด็กที่อายุน้อยกว่า 5 ปีมีความเสี่ยงในการเกิดปอดอักเสบมากขึ้น

คำสำคัญ: โควิด-19 เด็ก ปอดอักเสบ ปัจจัยเสี่ยง

กลุ่มงานกุมารเวชศาสตร์ โรงพยาบาลเลิดสิน กรุงเทพมหานคร