

## ORIGINAL PAPER

Pediatrics

# Does Covid-19 in children have a milder course than Influenza?

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Email: drkamiliyilmaz@gmail.com**Abstract**

**Background:** In December 2019, a novel type of coronavirus infection emerged in the Wuhan province of China and began to spread rapidly. In this study, we aimed to determine the differences between COVID-19 disease and Influenza.

**Methods:** This retrospective study included 164 children with COVID-19, as well as 46 children with Influenza. The two groups were compared with respect to clinical and laboratory parameters and the rates of intensive care and mechanical ventilation requirement.

**Results:** In both groups, the most common admission complaints were fever and cough. As compared to the COVID-19 group, the Influenza group had significantly higher rates of cough (37 [80.4%] and 38 [23.2%]), fever (31 [67.4%] and 34 [20.7%]), muscle pain (34 [73.9%] and 31 [18.9%]), vomiting (13 [28.9%] and 8 [4.9%]) and tachypnea (32 [69.6%] and 3 [1.8%]) ( $P < .01$  for all comparisons). The mean WBC count ( $7.10 \pm 1.08$  vs.  $10.90 \pm 1.82$ ), mean neutrophil count ( $3.19 \pm 0.58$  vs.  $6.04 \pm 0.97$ ), APTT, CRP, procalcitonin, ALT, and LDH levels were significantly lower in the COVID-19 group compared to the Influenza group ( $P < .05$  for all comparisons). There was, however, no significant difference between the mean lymphocyte counts of both groups. The Influenza group had significantly higher rates of intensive care requirement (19 [41.3%] vs. 3 [1.8%]) and mechanical ventilation requirement (16 [34.8%] vs. 2 [1.2%]) as well as a significantly higher mortality rate (7 [15.2%] vs. 2 [1.2%]) than the COVID-19 group ( $P < .01$ ).

**Conclusion:** COVID-19 and Influenza may share similar clinical features. According to our findings, however, we believe that COVID-19 disease has a milder clinical and laboratory course than Influenza in children.

## 1 | INTRODUCTION

In December 2019, a novel type of coronavirus infection emerged in the Wuhan province of China and began to spread rapidly. The disease is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). Since then, the virus has affected more than 200 countries worldwide and caused a global pandemic. Named as COVID-19 by World Health Organization (WHO), this disease has caused 92 506.811 cases and 2001.773 deaths worldwide as of 16 January 2021.<sup>1</sup>

Studies have shown that the SARS-CoV-2 virus binds to angiotensin-converting enzyme 2 (ACE2) receptors to infect epithelial cells that line the inner surface of the respiratory and gastrointestinal tracts.<sup>2</sup> The virus is highly contagious and is transmitted from symptomatic or asymptomatic infected persons via close contact or aerosols.<sup>3</sup>

Many studies have shown that COVID-19 disease may have a milder or asymptomatic course in children compared to adults.<sup>4</sup> Of note, however, the number of Multisystem Inflammatory syndrome in Children (MIS-C) cases that develop after SARS-Cov-2 infection

has started to increase gradually.<sup>5</sup> Nevertheless, the clinical course of COVID-19, the pathophysiology of MIS-C, and its long-term complications in children remain unclear.

Influenza is an acute respiratory disease caused by Influenza A, B, and rarely Influenza C viruses. It emerges, especially in the autumn and winter. Symptoms such as fever, cough, sore throat, and malaise are commonly observed. Although it usually leads to a self-limiting and uncomplicated disease in healthy children, it may be a source of morbidity and mortality due to underlying chronic disorders and age.<sup>5</sup>

Both SARS-COV-2 and influenza viruses have the potential of human-to-human transmission via droplets. Children exposed to these viruses may have mild symptoms such as fever, cough, muscle pain, and sore throat, but they may also have clinical presentations severe enough to require intensive care or advanced respiratory support.<sup>6</sup>

A review of the literature indicates that a limited number of studies have compared these two diseases in children.<sup>6-8</sup> In the present study, we aimed to compare the clinical and laboratory features of the pediatric cases caused by SARS-CoV-2 and influenza viruses, which have different characteristics and to determine if they have any differences.

## 2 | MATERIAL AND METHOD

This study included 175 patients of both genders aged 0-18 years who were diagnosed with COVID-19 confirmed by Real-time polymerase chain reaction (RT-PCR) test and hospitalized at Dicle University COVID-19 pediatric department and intensive care unit and between March 2020 and November 2020, as well as 69 patients of both genders who were diagnosed with Influenza A and B confirmed by RT-PCR in a respiratory panel and hospitalized at the pediatric department of our hospital between January 2016 and November 2020. Age, sex, length of hospitalization, hematological and biochemical parameters, and acute phase reactants of all patients were retrospectively reviewed in digital and written patient records. Twenty-three patients in the Influenza group and 11 patients in the COVID-19 group were excluded from the study due to missing or incomplete medical records. Clinical and laboratory data, intensive care requirement, and mortality rate of the two groups were compared.

Patients who were older than 18 years, as well as patients whose clinical and laboratory data could not be accessed, were excluded from both groups.

The study was conducted based on the rules of the Declaration of Helsinki and approved by the Republic of Turkey Ministry of Health and Institutional Ethics Committee of Dicle University, Faculty of Medicine (07.01.2021/47).

### 2.1 | Laboratory testing

Combined oropharyngeal and nasopharyngeal swab samples were taken from the patients to diagnose COVID-19. The samples

### What's known

Both SARS-COV-2 and influenza viruses have the potential of human-to-human transmission via droplets. Fever and cough were the most common symptoms in the COVID-19 and Influenza patients. Children exposed to these viruses may have mild symptoms such as fever, cough, muscle pain, and sore throat, but they may also have clinical presentations severe enough to require intensive care or advanced respiratory support.

### What's new

Fever, cough, sore throat, and myalgia were much more prominent in Influenza patients. COVID-19 patients had significantly lower WBC and neutrophil counts and APTT, CRP, procalcitonin, ALT, and LDH levels compared to the Influenza patients, whereas the two groups had similar lymphocyte counts. We determined that the Influenza patients had higher rates of intensive care and mechanical ventilation requirement. rates of intensive care and mechanical ventilation requirement.

were then studied in the laboratory with Light Cyler 96 (Roche<sup>®</sup>, Switzerland) device using Bio-Speedy<sup>®</sup> COVID-19 RT-qPCR (BioEksen<sup>®</sup>, Istanbul/Turkey) Detection Kit in accordance with the manufacturer's recommendations. The tests were evaluated as indicated in the table if the positive and negative control results were appropriate according to the manufacturer's recommendations.

The respiratory samples sent to the laboratory to diagnose Influenza were extracted with RINA<sup>™</sup> M14 (BioEksen<sup>®</sup>, Turkey) Nucleic acid extraction device, using Bio-Speedy<sup>®</sup> RINA<sup>™</sup> M14 Viral Nucleic Acid Isolation (BioEksen<sup>®</sup>, Turkey) kit. The multiplex PCR tests were studied with Light Cyler 96<sup>™</sup> (Roche<sup>®</sup>, Switzerland) device, using Bio-Speedy<sup>®</sup> Respiratory Tract multiplex qPCR (BioEksen<sup>®</sup>, Turkey) kits in accordance with the manufacturer's recommendations.

### 2.2 | Statistical analysis

Data analyses were performed using Statistical Package for Social Sciences (SPSS), Version 22.0 for Windows (SPSS Inc, Chicago, IL, USA). Visual (probability plots, histograms) and analytical (Kolmogorov-Smirnov test) methods were used to assess whether the variables were normally distributed. Normally distributed variables are shown using means and standard deviations, and non-normally distributed variables using median and range (maximum and minimum). Comparisons of the groups were evaluated using the Student's *t* test and the Mann-Whitney *U* test, according to the distribution of the variables. The chi-square test was used to compare proportions in different groups. Survival was estimated using

the Kaplan-Meier method and compared using the log-rank test. A  $P$  value  $< .05$  was considered significant.

### 3 | RESULTS

Of 164 patients who were hospitalized with COVID-19, 57.3% (94/164) were male; the mean age of the COVID-19 patients was  $93.9 \pm 16.5$  months. The median length of hospitalization was 2 (1-14) days. Three (1.8%) patients needed intensive care, two (1.2%) of whom also needed mechanical ventilation support. Two (1.2%) patients died. Three COVID-19 patients had underlying comorbidities, with one patient having acute lymphoblastic leukemia and the other two having chronic lung disorders.

Of 46 patients who were hospitalized with Influenza, 41 (89%) had Influenza A, and 5 (11%) had Influenza B subtypes. In this group, 45.6% of patients were male, and the mean age was  $87.5 \pm 12.4$  months. The median length of hospitalization was 14 (1-74) days. Forty-one-point-three percent (19/46) of the Influenza patients needed intensive care, and 16 (34.8%) received mechanical ventilation support. Seven (15.2%) patients in this group died. Twenty-eight percent of the Influenza patients had at least one comorbidity (asthma, chronic bronchiolitis, hematological or cardiac disorders). None of the patients had a history of vaccination for influenza.

There was no significant difference between the two groups with respect to mean age and sex distribution ( $P = .47$ ,  $P = .18$ , respectively). The Influenza patients had a significantly higher length of hospitalization, higher rates of intensive care and ventilatory support requirement, and higher mortality rate as compared with the COVID-19 group (Chi-square test) (Table 1) ( $P < .01$ ). When we compare the 2 groups in terms of treatment; Oseltamivir, steroid and oxygen usage rates were significantly higher in influenza patients

( $P < .01$ ). However, according to the Kaplan-Meier analysis, no significant difference was found between the two groups in terms of length of hospitalization and survival rate (Figure 1). The median follow-up time was 3 days (range: 1-28 days).

#### 3.1 | Comparison of the clinic characteristics of the COVID-19 patients and the Influenza (A and B) patients

Cough, fever, muscle pain, and malaise were the most common admission complaints in both groups. As compared with the COVID-19 group, the Influenza group had significantly higher rates of cough (37 [80.4%] and 38 [23.2%]), fever (31 [67.4%] and 34 [20.7%]), muscle pain (34 [73.9%] and 31 [18.9%]), vomiting (13 [28.9%] and 8 [4.9%]), sore throat (11 [23.9%] and 10 [6.1%]), nasal discharge (5 [10.9%] and 3 [1.8%]) and tachypnea (32 [69.6%] and 3 [1.8%]) ( $P < .01$ ). The rates of headache, diarrhea, and conjunctivitis symptoms were similar in the two groups ( $P > .05$ ), (Table 2).

#### 3.2 | Comparison of the hematological parameters between the COVID-19 patients and the Influenza (A and B) patients

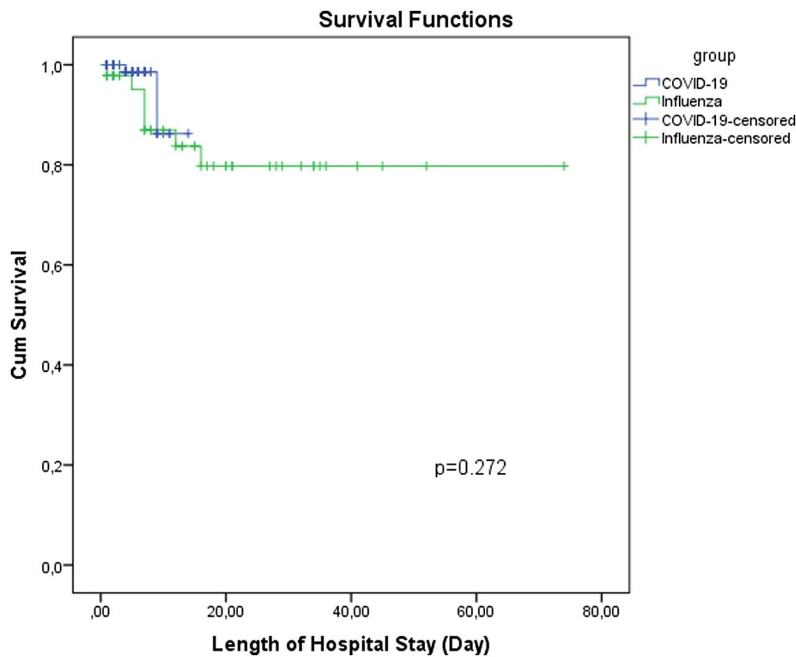
The Influenza group had lower mean hemoglobin and red blood cell distribution width (RDW) but significantly higher white blood cell (WBC) and neutrophil counts than the COVID-19 group ( $P < .05$ ). There was no significant difference between the two groups in terms of the mean thrombocyte and lymphocyte counts and the mean platelet volume ( $P > .05$ ).

Among the coagulation parameters, only APTT was significantly greater in the Influenza group ( $P < .01$ ) (Table 3).

**TABLE 1** Comparison of demographic features and outcomes between COVID-19 and Influenza patients

Parameters	COVID-19 (n = 164)	Influenza A and B (n = 46)	P
Gender (F/M)	70/94	25/21	.18
Age (month), (Mean $\pm$ SD)	$93.9 \pm 16.5$	$87.5 \pm 12.4$	.47
present at the time SPO <sub>2</sub> , (Mean $\pm$ SD)	$96.82 \pm 1.83$	$82.28 \pm 13.60$	<.01
Patients requiring ICU stay, (n, %)	3 (1.8%)	19 (41.3%)	<.01
Mechanical ventilator support, (n, %)	2 (1.2%)	16 (34.8%)	<.01
Length of hospital stay, median (min.-max.) days	2 (1-14)	14 (1-74)	<.01
Deaths (n, %)	2 (1.2%)	7 (15.2%)	<.01
<i>Therapeutic strategy</i>			
Oxygen support	3 (1.8%)	20 (43.4%)	<.01
Steroid	1 (0.6)	6 (13%)	<.01
Oseltamivir	11 (6.7)	41 (89.1)	<.01

Abbreviations: n, number of patients; SD, standard deviation; SPO<sub>2</sub>, oxygen saturation.



**FIGURE 1** Comparison of the 2 groups in terms of hospital stay and surveillance (Kaplan-Meier analysis)

**TABLE 2** Comparison of clinical characteristics between COVID 19 and Influenza patients

Symptoms present at the time of diagnosis	COVID-19 (n = 164)	Influenza A and B (n = 46)	P
Fever >38°C (n, %)	34 (20.7%)	31 (67.4%)	<.01
Dry cough (n, %)	38 (23.2%)	37 (80.4%)	<.01
Myalgia (n, %)	31 (18.9%)	34 (73.9%)	<.01
Vomiting (n, %)	8 (4.9%)	13 (28.9%)	<.01
Headache (n, %)	23 (14%)	8 (17.4%)	.63
Diarrhea (n, %)	11 (6.7%)	6 (13%)	.16
Sore throat (n, %)	10 (6.1%)	11 (23.9%)	<.01
Runny nose (n, %)	2 (1.2%)	5 (10.9%)	<.01
Conjunctivitis (n, %)	5 (3%)	3 (6.5%)	.27
Tachypnea (n, %)	3 (1.8%)	32 (69.6%)	<.01

### 3.3 | Comparison of the biochemical parameters and acute phase reactants between the COVID-19 patients and Influenza (A and B) patients

A comparison of the acute phase reactants between the study groups showed a median C reactive protein (CRP) level of 0.10 mg/dL (min. 0.002-max. 20.20) and a median procalcitonin level of 0.01 ng/mL (min. 0.001-max. 210) in the COVID-19 group. In the Influenza group, the median CRP level was 0.47 mg/dL (min. 0.001-max. 17.48) and the median procalcitonin level was 0.22 ng/mL (min. 0.020-max. 0.690). CRP, procalcitonin, alanine aminotransferase (ALT), aspartate aminotransferase (AST), and lactate dehydrogenase (LDH) levels were significantly higher in the Influenza group than in the COVID-19 group ( $P < .01$ ). Other laboratory parameters were shown in Table 4.

## 4 | DISCUSSION

COVID-19 pandemic continues to have a growing impact on the whole world. According to WHO data, approximately more than 2 million people have died from this disease from December 2019 to the end of January 2021.<sup>1</sup> Thanks to data that have accumulated in the last year, we now know that, although COVID-19 initially affects the respiratory tract, it affects multiple organs and systems, causing a number of complications like MIS-C.<sup>9-11</sup> Influenza puts a significant disease burden on children worldwide through high hospitalization, morbidity, and mortality rates.<sup>12</sup>

In our country, all patients with a confirmed diagnosis of Covid 19 are called by the filiation teams of the Ministry of Health and family physicians during the 14-day isolation process. Patients with mild conditions are isolated in their homes. Patients who are determined to need a hospital are taken from their homes by ambulance to be evaluated at the hospital. These procedures are applied in the same way for patients discharged from the hospital.

Our objective was to investigate the differences between the clinical and laboratory features, intensive care and mechanical ventilation requirements, and mortality rates of these two diseases that share similar characteristics. Our review of the studies in the literature on this subject indicated that Song et al<sup>6</sup> compared patients with COVID-19 and Influenza and reported an intensive care unit admission rate of 33% for children hospitalized with COVID-19 and 34% for children hospitalized with Influenza. The authors did not find any significant difference between the two groups with respect to intensive care requirement, length of hospitalization, mechanical ventilation requirement, and mortality rate. In another study, Sousa et al<sup>13</sup> found that the COVID-19 patients had a rate of intensive care requirement of 31%, a rate of invasive mechanical ventilation requirement of 13.7%, a rate of noninvasive support requirement of 29.3%, and a mortality rate of 15.2%. The Influenza patients had a

**TABLE 3** Comparison of hematological parameters between COVID 19 and Influenza patients

Parameters	COVID-19 (n = 164)	Influenza A and B (n = 46)	P
	Mean ± SD	Mean ± SD	
Wbc (10 <sup>3</sup> /μL)	7.10 ± 1.08	10.90 ± 1.82	<.05
Neutrophil count (10 <sup>3</sup> /μL)	3.19 ± 0.58	6.04 ± 0.97	<.05
Lymphocyte count (10 <sup>3</sup> /μL)	3.07 ± 0.41	3.40 ± 0.52	.36
Hemoglobin (g/dL)	12.92 ± 2.95	11.03 ± 2.06	<.01
Platelet count (10 <sup>3</sup> /μL)	281.68 ± 30.66	279.81 ± 28.43	.95
MPV	8.50 ± 1.54	8.10 ± 1.39	.27
RDW (fl)	12.53 ± 1.93	11.03 ± 2.06	<.05
INR, s	1.12 ± 0.13	1.22 ± 0.17	.38
APTT, s	27.87 ± 3.68	33.64 ± 2.89	<.01
PT, s	13.41 ± 2.16	15.54 ± 2.34	.06

Abbreviations: APTT, activated partial thromboplastin time; INR, international normalized ratio; MPV, mean platelet volume; PT, prothrombin time; RDW, red blood cell distribution width; S, second; SD, standard deviation; WBC, white blood cell.

**TABLE 4** Comparison of laboratory findings between COVID 19 and Influenza patients

Parameters	COVID-19 (n = 164)	Influenza A and B (n = 46)	P
	Mean ± SD	Mean ± SD	
CRP (mg/dL) <sup>a</sup> , ref.: (0.0-0.5)	0.10 (0.002-20.20)	0.47(0.001-17.48)	<.01
Procalcitonin (ng/mL) <sup>a</sup> , ref.: (0.0-0.12)	0.01(0.001-210)	0.22 (0.020-0.690)	<.01
LDH (U/L)	276.20 ± 42.18	603.46 ± 92.83	<.01
AST (U/L)	33.09 ± 5.97	81.35 ± 12.28	<.01
ALT (U/L)	18.93 ± 5.21	40.89 ± 6.27	<.01
Sodium (mmol/L)	135.74 ± 10.67	135.40 ± 3.90	.83
Potassium (mmol/L)	5.51 ± 0.13	4.35 ± 0.74	.45
Glucose (mg/dL)	93.48 ± 16.23	100.83 ± 19.89	.04
Urea (mg/dL)	23.37 ± 3.22	24.79 ± 2.05	.60
Creatinine (mg/dL)	0.65 ± 0.08	0.43 ± 0.06	.49
ALP (mg/dL)	209.80 ± 33.29	144.97 ± 23.57	<.01

Abbreviations: ALP, alkaline phosphatase; ALT, alanine aminotransferase; AST, aspartate aminotransferase; CRP, C-reactive protein; LDH, lactate dehydrogenase; ref., references; SD, standard deviation.

<sup>a</sup>Median (range; minimum–maximum).

rate of intensive care requirement of 31%, a rate of invasive mechanical ventilation requirement of 12.1%, and a mortality rate of 4.5%. In a 10-year retrospective review of Australian pediatric Influenza patients, Teutsch et al<sup>14</sup> reported that almost half (45.2%) of patients required intensive care while 23% required mechanical ventilation support. They determined a mortality rate of 4.9% among Influenza patients.

In our study, on the other hand, we determined higher rates of mortality, intensive care requirement, and mechanical ventilation requirement. Studies in the literature on this subject have reported variable results, which may be principally related to the presence of underlying comorbidities, the presence of MIS-C in COVID-19 patients, the quality of the healthcare service, and the vaccination status of Influenza patients.

Common clinical symptoms may be seen in infections affecting the respiratory tract. A review of the previous studies comparing the Influenza and COVID-19 symptoms revealed that fever and cough were the most common symptoms in both groups.<sup>6,8,13</sup> It was also reported that the rates of fever, cough, respiratory difficulty and gastrointestinal symptoms were significantly higher in Influenza patients compared to COVID-19 patients.<sup>7,8,13</sup>

Our study results, which indicated that fever, cough, and myalgia were the most common symptoms in both groups, are also in accordance with literature reports. However, fever, cough, myalgia, respiratory difficulty, sore throat, vomiting, and nasal discharge were significantly more common in the Influenza patients compared to the COVID-19 patients. Our results indicate that, although the same symptoms may be seen in both diseases, lower rates of fever, cough,

sore throat and myalgia in COVID-19 patients suggest that COVID-19 may have a milder symptomatic course than Influenza. However, considering the rise in MIS-C cases, one should bear in mind that different results may emerge in the future or that the disease may lead to different outcomes as a result of possible mutations in the viral genome.

To our knowledge, there exist data indicating that hematological parameters may provide some clues about the severity of some diseases. Coronavirus disease may cause diverse effects in many systems.<sup>11,15,16</sup> Among these, there are also hematological parameters.

Rahi et al reported that "SARS CoV-2 can cause disturbances in the coagulation cascade, cytokine storm, and intravascular thrombosis by infecting monocytes and endothelial cells".<sup>17,18</sup> Studies on adults have suggested that the disease can cause both arterial and venous thrombosis, particularly pulmonary embolism and pulmonary micro thromboses.<sup>17-19</sup> In a meta-analysis of 624 children with coronavirus disease, the researchers stated that "there are variations in the leukocyte index of mild and severe COVID-19 cases; thus the leukocyte indices will not be a reliable parameter in determining disease severity in children".<sup>20</sup> When we reviewed pediatric studies performed to date, we noted that COVID-19 patients had lower prothrombin time (PT), WBC count, and neutrophil count, and higher lymphocyte count than Influenza patients.<sup>7,8</sup> A comparison of our study groups in terms of hematological parameters revealed that the COVID-19 patients had significantly lower WBC count, neutrophil count, and activated partial thromboplastin time (APTT) but a higher hemoglobin and RDW level compared to the Influenza patients. Our results are similar to the results of others, and we believe that, unlike adults, more studies are needed to make unequivocal and clear statements on this issue in children.

Although COVID-19 disease has a milder course in children than adults, there are also severe pediatric presentations.<sup>4,21</sup> Changes in acute phase reactants in the course of many diseases are carefully monitored by clinical physicians. When we analyzed biochemical parameters and acute phase reactants and compared them between the two groups, we obtained some striking results. Especially CRP, procalcitonin, ALT, AST, and LDH levels were significantly higher in the Influenza group compared to the COVID-19 group.

A review of the literature studies indicates that Li et al<sup>8</sup> revealed higher CRP and procalcitonin levels in the Influenza patients compared to the COVID-19 patients, although ALT, AST, urea, creatinine, and LDH levels were similar in both groups. Zhao et al<sup>7</sup> reported higher CRP, erythrocyte sedimentation rate, ALT, and LDH levels in the Influenza patients. A meta-analysis performed by Henry et al found that "CRP, procalcitonin, and LDH levels increased in severe COVID-19 disease; thus, it recommended that CRP, procalcitonin, and LDH levels should be serially monitored in children hospitalized with COVID-19".<sup>20</sup> Our results support this view.

#### 4.1 | Study limitations

Our study had some limitations. Our study data were retrospectively obtained from the medical records of patients hospitalized in a single

center. Another study limitation is that the number of Influenza patients was smaller than that of the COVID-19 patients. In addition, the absence of a vaccination history in any of the Influenza patients in our study group may have led to different results than the previous studies.

## 5 | CONCLUSION

In conclusion, the clinical symptoms and laboratory parameters of the Influenza and COVID-19 diseases may share similar features. Fever and cough were the most common symptoms in the COVID-19 and Influenza patients. However, fever, cough, sore throat, and myalgia were much more prominent in Influenza patients. COVID-19 patients had significantly lower WBC and neutrophil counts and APTT, CRP, procalcitonin, ALT, and LDH levels compared to the Influenza patients, whereas the two groups had similar lymphocyte counts. We determined that the Influenza patients had higher rates of intensive care and mechanical ventilation requirement. Considering the possibility that COVID 19 will become permanent in our lives for many years, like Influenza, the results of our study may provide a preliminary idea to differentiate these two diseases sharing similar clinical and laboratory features in cases where clinicians cannot isolate the causative virus. It should be remembered that COVID-19 disease may show variations. Therefore, a greater number of studies and large-scale studies are needed to make precise statements on this subject.

#### DISCLOSURES

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

#### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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#### REFERENCES

1. World Health Organization. <https://covid19.who.int/>. Accessed January 12, 2021.
2. Zou X, Chen K, Zou J, Han P, Hao J, Han Z. Single-cell RNA-seq data analysis on the receptor ACE2 expression reveals the potential risk of different human organs vulnerable to 2019-nCoV infection. *Front Med*. 2020;14:185-192.
3. Jin Y-H, Cai L, Cheng Z-S, et al. A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version). *Mil Med Res*. 2020;7:4.
4. Yılmaz K, Gozupirinççioğlu A, Aktar F, et al. Evaluation of the novel coronavirus disease in Turkish children: preliminary outcomes. *Pediatr Pulmonol*. 2020;55:3587-3594.

5. Aronoff SC, Hall A, Del Vecchio MT. The Natural History of SARS-Cov-2 related multisystem inflammatory syndrome in children (MIS-C): a systematic review. *J Pediatr Infect Dis Soc.* 2020;9:746-751.
6. Song X, Delaney M, Shah RK, Campos JM, Wessel DL, DeBiasi RL. Comparison of clinical features of COVID-19 vs seasonal influenza A and B in US children. *JAMA Netw Open.* 2020;3:e2020495.
7. Zhao Y, Sun L, Bouchard HC, et al. Coronavirus Disease 2019 versus Influenza A in children: an observational control study in China. *Biomed Environ Sci.* 2020;33:614-619.
8. Li Y, Wang H, Wang F, et al. Comparison of hospitalized patients with pneumonia caused by COVID-19 and influenza A in children under 5 years. *Int J Infect Dis.* 2020;98:80-83.
9. Dufort EM, Koumans EH, Chow EJ, et al. Multisystem inflammatory syndrome in children in New York State. *New Engl J Med.* 2020;383:347-358.
10. Ebina-Shibuya R, Namkoong H, Shibuya Y, Horita N. Multisystem Inflammatory Syndrome in Children (MIS-C) with COVID-19: insights from simultaneous familial Kawasaki Disease cases. *Int J Infect Dis.* 2020;97:371-373.
11. Sankar J, Dhochak N, Kabra SK, Lodha R. COVID-19 in children: clinical approach and management. *Indian J Pediatr.* 2020;87:433-442.
12. Nayak J, Hoy G, Gordon A. Influenza in children. *Cold Spring Harb Perspect Med.* 2021;11:a038430.
13. Sousa BLA, Sampaio-Carneiro M, de Carvalho WB, Silva CA, Ferraro AA. Differences among severe cases of Sars-CoV-2, influenza, and other respiratory viral infections in pediatric patients: symptoms, outcomes and preexisting comorbidities. *Clinics (Sao Paulo, Brazil).* 2020;75:e2273.
14. Teutsch SM, Zurynski YA, Nunez C, et al. Ten years of national seasonal surveillance for severe complications of influenza in Australian children. *Pediatr Infect Dis J.* 2020;40:191-198.
15. Pousa PA, Mendonça TSC, Oliveira EA, Simões ESAC. Extrapulmonary manifestations of COVID-19 in children: a comprehensive review and pathophysiological considerations. *Jornal de pediatria.* 2020;97:116-139.
16. Rekhman S, Tannenbaum R, Strunk A, Birabaharan M, Wright S, Garg A. Mucocutaneous disease and related clinical characteristics in hospitalized children and adolescents with COVID-19 and multisystem inflammatory syndrome in children. *J Am Acad Dermatol.* 2021;84:408-414.
17. Rahi MS, Jindal V, Reyes SP, Gunasekaran K, Gupta R, Jaiyesimi I. Hematologic disorders associated with COVID-19: a review. *Ann Hematol.* 2021;100:309-320.
18. Mokhtari T, Hassani F, Ghaffari N, Ebrahimi B, Yarahmadi A, Hassanzadeh G. COVID-19 and multiorgan failure: a narrative review on potential mechanisms. *J Mol Histol.* 2020;51:613-628.
19. Iba T, Connors JM, Levy JH. The coagulopathy, endotheliopathy, and vasculitis of COVID-19. *Inflamm Res.* 2020;69:1181-1189.
20. Henry BM, Benoit SW, de Oliveira MHS, et al. Laboratory abnormalities in children with mild and severe coronavirus disease 2019 (COVID-19): a pooled analysis and review. *Clin Biochem.* 2020;81:1-8.
21. Souza TH, Nadal JA, Nogueira RJN, Pereira RM, Brandão MB. Clinical manifestations of children with COVID-19: a systematic review. *Pediatr Pulmonol.* 2020;55:1892-1899.

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