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Original Research

Evaluation of Our Paediatric Patients Hospitalised with Covid-19 Diagnosis: Single Centre Experience

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Abstract

Objectives: We analyses separate age groups for in-hospital COVID pediatric patients clinical symptoms, lab tests, and treatment efforts. We also wanted to see if having another illness or a patient's nutritional condition could change the way the disease unfolds.

Methods: Between July 2020 and September 2021, 90 pediatric patients (aged 1 month-18 years) with positive PCR and/or antibody tests who were hospitalised in our hospital were included in the study. Patients were classified according to age groups (0-2, 2-5, 5-12, >12 years), disease severity and presence of comorbidities. Demographic characteristics, clinical findings, laboratory parameters and radiological imaging were evaluated.

Results: The disease had a mild course in 73.3% of the patients with a mean age of 87 months. In the youngest age group (0-2 years), fever (53.3%) and respiratory distress (26.7%) were more common and hospital stay was longer (median 7 days). Comorbidity rate (47.4%) was significantly higher in the moderate to severe disease group ($p<0.001$). The rates of elevated CRP (54.5%) and pathological chest radiography (36.4%) were higher in obese children. Recovery time was significantly longer in comorbid patients (7.3±2.4 days).

Conclusion: Our study suggests that COVID-19 does not affect all children in the same way—it appears to vary notably with age. In our observations, younger children and those with existing health conditions seem to require a bit more care and close monitoring to ensure the best outcomes.

Keywords: Paediatric COVID-19, clinical features, comorbidities, nutritional status, hospitalisation outcomes

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The COVID-19 pandemic has become a major public health crisis, profoundly affecting global health, economy and social life. Although SARS-CoV-2 infection is considered a mild disease, especially among children, there is still limited information on how children can be protected against the long-term consequences of COVID-19.[1, 2] Although low morbidity rates have been observed among children, cases with a severe course have been reported to be mostly associated with comorbidities. This requires a better understanding of the clinical and laboratory characteristics of the paediatric population and optimisation of treatment approaches.[3, 4]

The existing literature on the effects of COVID-19 on children focuses on the mild course of the disease in children. However, most of these studies are based on general findings and do not address the relationships between age groups, clinical symptoms and laboratory results in sufficient detail. In particular, studies describing the effects of

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children with comorbidities on treatment outcomes are limited.[1] In addition, it has been reported that COVID-19 is not limited to mild symptoms in children, and some patients may develop post-infectious hyperinflammatory syndromes such as Multisystem Inflammatory Syndrome (MIS-C).[5] This study aims to fill the knowledge gap in this field by detailing the clinical features of COVID-19 cases in childhood and the impact of comorbidity on the disease course.

There are still significant gaps in knowledge about the clinical course and treatment approaches of COVID-19 in childhood. In our study, we hypothesised that clinical differences, laboratory findings and treatment responses will vary between age groups in pediatric patients hospitalised with a diagnosis of COVID-19. It was predicted that the disease would be more severe especially in younger age groups, the clinical picture would be more serious in the presence of comorbidities, and the duration of treatment would be prolonged. According to this hypothesis, our research goal was to analyze and compare the clinical particulars, laboratory results, radiological imaging, and treatment responses of children hospitalized due to COVID-19 by age groups, while also assessing the impact of comorbidities and nutritional status on the progression of the disease. The information we expect to gather, we believe, will aid in the formulation of age-specific management protocols and risk factor determination in cases of childhood COVID-19 infection.

Methods

Study Design and Patient Selection

This study is a retrospective, single-centre study conducted at a tertiary care hospital between 1 July 2020 and 30 September 2021. The study included hospitalised paediatric patients aged between 1 month and 18 years, whose COVID-19 diagnosis was confirmed by PCR and/or antibody tests. Nasopharyngeal and oropharyngeal swab samples were taken for PCR testing, and the samples were analysed by the real-time RT-PCR method. Suspected COVID-19 cases with negative PCR and antibody tests were excluded from the study.

Data Collection and Clinical Evaluation

Demographic characteristics, clinical findings, laboratory results and radiological imaging were obtained from patient files and electronic records. Age, gender, body mass index, underlying diseases, presenting complaints, contact history and duration of hospitalisation were recorded on a case follow-up form specially prepared for each patient. Laboratory tests included complete blood count parameters (haemoglobin, leukocyte, neutrophil, lymphocyte, platelet), inflammatory markers (CRP, sedimentation, procalcitonin, ferritin, fibrinogen), D-dimer, liver function tests (AST, ALT), cardiac markers (troponin, CK-MB), LDH and other biochemical parameters.

Radiological Evaluation

Chest radiographs of all patients were taken and evaluated for the presence of pathological findings. Thorax computed tomography (CT) examination was performed in the presence of a clinical indication. Thorax CT findings were classified as stage 1 (minimal involvement), stage 2 (moderate involvement) and stage 3 (extensive involvement) according to the extent of infiltration. All chest radiographs were retrospectively reviewed and evaluated by a board-certified pediatric radiologist who was blinded to the clinical data.

Treatment and Follow-up

Patients were followed up with antibiotic-free follow-up, antiviral treatment (Favipiravir), antibiotic treatment, anticoagulant treatment or combinations of these treatments according to clinical findings. Complications (bacterial superinfection, MIS-C) and the need for oxygen therapy were recorded.

Statistical Analysis

In our study, statistical analyses were performed using IBM SPSS Statistics for Windows, Version 26.0 (Armonk, NY: IBM Corp.). In descriptive statistics, number and percentage values for categorical variables, mean, standard deviation, minimum and maximum values for numerical variables were given. In the comparison of independent groups, Student t-test was used when the normal distribution condition was met, and Mann Whitney U test was used when it was not met. Chi-square test was used to compare categorical variables. Determinant factors were analysed by logistic regression analysis. Statistical significance level was accepted as $p<0.05$.

Ethics Committee Approval

The study protocol was approved by Prof. Dr. Cemil Taşcıoğlu City Hospital Ethics Committee (Approval Date: 08.11.2021, Number: 390). All stages of the study were conducted in accordance with the principles of the Declaration of Helsinki.

Results

In retrospective analyses of pediatric patients who were hospitalised with a diagnosis of COVID-19 since the beginning of the pandemic, differences according to age groups

are noteworthy. In 90 paediatric patients evaluated, the mean age was 87 months (minimum 1 month, maximum 384 months). When the patients were divided into age groups, symptoms such as fever and respiratory distress were observed more frequently in the youngest age group (0-2 years) and the hospital stay was longer. In this group, the proportion of patients treated without antibiotics was lower and the proportion of patients treated with antiviral therapy was higher. As we moved towards the older age groups (5-12 years and 12+ years), the disease showed a milder course and complications decreased. In addition, the rate of avoiding antibiotic use increased in these groups. In terms of laboratory findings, significant differences were found in white blood cell and CRP values according to age groups; these findings were associated with the severity of the disease. In treatment approaches, the need for oxygen therapy was observed more frequently in younger age groups, whereas this rate decreased in older children. In general, the duration of hospitalisation shortened with increasing age, with the longest in the 0-2 age group and the shortest in the 12+ age group (Table 1) (Fig. 1).

In our study, laboratory and radiological findings of 90 pediatric patients hospitalised with the diagnosis of COVID-19 were evaluated. Haemoglobin values were generally normal or slightly low. White blood cell counts varied in a wide range and were found below or above normal limits in some patients. Lymphocyte counts were significantly decreased in severe cases. Platelet counts were mostly within the normal range. Inflammatory markers (CRP, ferritin and D-dimer) evaluated according to age groups tended to increase with increasing age. In particular, CRP levels were found to be low in the youngest age group, but increased significantly in the group older than 12 years. Ferritin and D-dimer values similarly showed an age-related increase. When the risk classification of the patients was made, it was observed that children in the high-risk group had elevated levels of at least two markers and required close follow-up. In the medium-risk group, there were patients with single marker elevation, while all markers were normal in the low-risk group. Radiological examinations showed that pathological findings were detected more frequently in chest radiographs in young children. While pathological findings were 40% in the 0-2 age group, this rate decreased to 25%

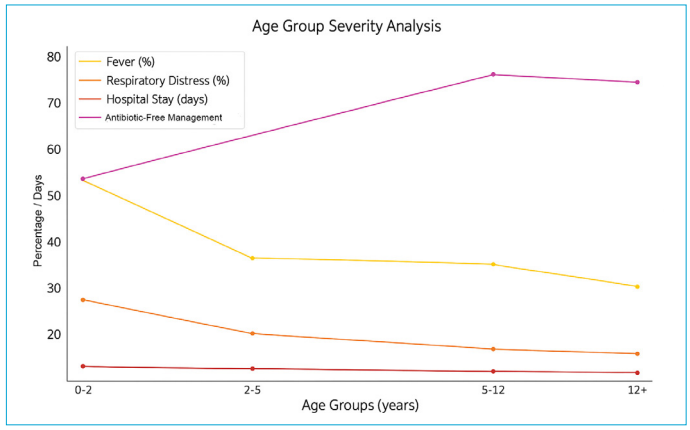

Figure 1. Age Group Severity Analysis: The figure illustrates the severity of COVID-19 across different pediatric age groups based on key clinical parameters. It presents trends for fever (%), respiratory distress (%), hospital stay (days), and antibiotic-free management (%), showing variations in disease severity and treatment approaches across age groups.

Table 1. Key demographic and clinical characteristics of paediatric COVID-19 patients (n=90)

Characteristics	Overall (n=90)	0-2 years (n=15)	2-5 years (n=18)	5-12 years (n=32)	12+ years (n=25)	p
Age (months), median (min-max)	87 (1-384)	-	-	-	-	<0.001
Gender (F/M), n	42/48	7/8	9/9	15/17	11/14	0.532
BMI (kg/m^2), mean±SD	19.1±6.8	16.8±2.1	17.4±2.3	19.3±4.2	22.1±5.8	<0.001
Presenting symptoms, n (%)						
Fever	35 (38.9)	8 (53.3)	7 (38.9)	12 (37.5)	8 (32.0)	0.003
Respiratory distress	12 (13.3)	4 (26.7)	3 (16.7)	3 (9.4)	2 (8.0)	0.001
Lab findings						
WBC (×10^3/μL), mean±SD	-	8.2±3.1	7.8±2.9	7.3±2.8	6.9±2.7	0.042
CRP (mg/L), median	-	3.8	3.2	2.6	2.1	0.038
Treatment, n (%)						
Antibiotic-free management	-	8 (53.3)	12 (66.7)	26 (81.3)	20 (80.0)	<0.001
Antiviral therapy	-	4 (26.7)	3 (16.7)	4 (12.5)	3 (12.0)	0.008
Oxygen requirement	-	3 (20.0)	2 (11.1)	2 (6.3)	1 (4.0)	0.002
Hospital stay, median days (min-max)	5 (1-21)	7 (2-21)	6 (1-15)	4 (1-12)	4 (1-10)	<0.001

Statistical Analysis: Mann-Whitney U test/Kruskal-Wallis test for continuous variables; Chi-square test for categorical variables.

in the 5-12 age group. Computed tomography was performed only in severe cases and pathological findings were observed in most of these patients. Radiological examinations support that the disease has a more severe course especially in young children (Table 2).

In our study, treatment approaches, symptom profiles, recovery times and complications of paediatric patients hospitalised due to COVID-19 were evaluated in detail. In the majority of patients (73.3%), the disease showed a mild course and was treated with conservative methods. In this group, hospitalisation was generally short (median 4 days) and treatment was limited to symptomatic monitoring. In moderate disease, antiviral therapy (e.g. Favipiravir) was used and hospitalisation was longer on average (median 6 days). In more severe cases, combined treatment approaches (including antibiotics, low molecular weight heparin or supportive therapies) were required, with a median length of stay of up to 8 days. When symptom patterns were analysed, 27.8% of patients had fever only, and this group generally had a mild course. Cases with cough (16.7%) usually had a mild to moderate course, while cases with respiratory symptoms (30%) had a more severe course. The combination of respiratory and systemic symptoms indicated a more severe disease picture requiring antiviral and oxygen therapy. Similarly, the need for treatment increased in cases where respiratory and gastrointestinal symptoms were combined. In 4.4% of the cases, gastrointestinal symptoms such as diarrhea and vomiting were observed in combination with respiratory symptoms. Isolated gastrointestinal symptoms were not reported in this cohort. Although these combined symptoms were more frequently seen in the younger age group, no statistically significant difference was found between age groups ($p>0.05$) (Table 3). 6.7% of patients were considered asymptomatic and were kept under observation only. When recovery times were evaluated according to age groups, the shortest recovery time was observed in the 5-12 age group (mean 4.9 days), while the longest recovery time was recorded in the 0-2 age group (mean 6.2 days). The recovery time was significantly prolonged in children with comorbidities (mean 7.3 days), whereas children without comorbidities recovered faster (mean 4.6 days). In terms of complications, bacterial superinfection was detected in 7.8% of patients and these patients required antibiotic treatment. Multisystem inflammatory syndrome (MIS-C) was observed in 3.3% of cases and these patients were treated with intravenous immune globulin (IVIG) and steroids. Myocarditis was observed in 2.2% and required close follow-up. Intensive care or oxygen therapy was required in 8.9% of patients (Table 3).

Table 2. Laboratory and radiological findings in paediatric COVID-19 (n=90)

Category	Parameter	Value/Range	Reference Range
Key Laboratory Parameters	Haemoglobin (g/dL)	11.8±1.9	11.5-15.5
	WBC (/μL)	7350 (1830-18600)	4500-11000
	Lymphocytes (/μL)	2510 (330-11790)	1500-7000
	Platelets (/μL)	287000±98000	150000-450000
Inflammatory Markers by Age Group	CRP (mg/L)	See below	<5.0
	Ferritin (ng/mL)	See below	7-140
	D-dimer (ng/mL)	See below	<500
Age-Specific Inflammatory Marker Values	0-2 years	CRP: 1.98±1.2, Ferritin: 75.6±45.3, D-dimer: 425±180	-
	2-5 years	CRP: 2.45±1.8, Ferritin: 82.4±52.1, D-dimer: 445±195	-
	5-12 years	CRP: 3.15±2.1, Ferritin: 95.8±58.4, D-dimer: 465±210	-
	>12 years	CRP: 3.85±2.4, Ferritin: 108.2±62.7, D-dimer: 485±225	-
Disease Severity Classification	High Risk (n, %)	22 (24.4%)	≥2 elevated markers
	Moderate Risk (n, %)	35 (38.9%)	1 elevated marker
	Low Risk (n, %)	33 (36.7%)	Normal markers
Imaging Findings	Chest X-ray (Normal)	63 (70.0%)	-
	Chest X-ray (Pathological)	27 (30.0%)	-
	CT Findings (Normal)	5 (21.7%)	-
	CT Findings (Pathological)	18	78.3%) -

All values are expressed as mean±SD or median (range). Statistical significance is set at $p<0.05$. CT imaging was performed only in selected severe cases.

Table 3. Treatment approaches, symptom patterns, recovery, and complications

Category	Parameter	Value/Details
Treatment Approaches	Conservative Management (n, %)	66 (73.3)
	Antiviral Therapy - Favipiravir (n, %)	11 (12.2)
	Combination Therapy* (n, %)	13 (14.5)
	*Includes combinations with antibiotics, LMWH, or other supportive treatments	-
Symptom Patterns and Outcomes	Isolated Fever (n, %)	25 (27.8)
	Isolated Cough (n, %)	15 (16.7)
	Respiratory Symptoms† (n, %)	27 (30.0)
	Combined Symptoms: Resp + Systemic	8 (8.9)
	Combined Symptoms: Resp + GI	4 (4.4)
	Combined Symptoms: Fever + Fatigue	10 (11.1)
	Asymptomatic (n, %)	6 (6.7)
	†Includes dyspnoea and other respiratory symptoms	-
Recovery Patterns	Mean Recovery Time (days) by Age Group	-
	0-2 years	6.2±2.1
	2-5 years	5.8±1.9
	5-12 years	4.9±1.7
	>12 years	5.4±2.0
	Recovery Time by Comorbidity Status	-
	Present	7.3±2.4
	Absent	4.6±1.5
Complications and Special Care Needs	Bacterial Superinfection (n, %)	7 (7.8)
	MIS-C (n, %)	3 (3.3)
	Myocarditis (n, %)	2 (2.2)
	ICU/Oxygen Need (n, %)	8 (8.9)

Values are expressed as mean±SD or median (range). Statistical significance is set at $p<0.05$. Treatment escalation is based on disease severity.

In our study, clinical characteristics, laboratory findings, treatment approaches and the effects of comorbidities were analysed in paediatric patients hospitalised with a diagnosis of COVID-19. While the median age of the patients in the mild disease group was 73 months, the median age in the moderate-severe disease group was 156 months. The rate of comorbidities was significantly higher in the moderate-severe disease group (47.4%) compared to the mild disease group (21.1%). Patients with a body mass index over 25 kg/m^2 were more common in the moderate-severe disease group (26.3% vs. 8.5%). Laboratory findings played an important role in the determination of disease severity. Lymphopenia, CRP >5 mg/L and D-dimer >500 ng/mL were frequently observed in the moderate-severe disease group, and elevated values of these parameters showed a strong correlation with disease severity. In the mild disease group, conservative treatment methods were generally applied and the median duration of treatment was determined as 4 days. In the moderate-severe disease group, antiviral therapy or combined therapy (antiviral, antibiotic and oxygen support) was more commonly used, and the median duration of treatment in these patients was prolonged up to 7 days. The impact of comorbidities on disease severity and length of hospital stay is striking. Respiratory diseases were generally of moderate severity, with a median length of hospitalisation of 4 days. Cardiac problems were associated with a higher severity of illness and the median length of stay was 12 days. Patients with neurological and metabolic-endocrine diseases showed a moderate disease severity, with median length of stay of 5 and 6 days, respectively. Patients with haematological or oncological diseases had the most unfavourable prognosis in terms of disease severity and risk of complications, with a median length of stay of 10 days (Table 4) (Fig. 2).

In our study, nutritional status, clinical course, laboratory and imaging findings, and contact history of paediatric patients hospitalised due to COVID-19 were investigated. As a result of the classification of patients according to body mass index (BMI), it was observed that the severity of the disease was higher, laboratory abnormalities and complication rates were higher in obese or overweight children. This group stayed longer in the hospital (median 6 days) and had

Table 4. Clinical characteristics, laboratory findings, treatments, and comorbidity impacts

Category	Parameter	Mild Disease (n=71)	Moderate-Severe (n=19)	p
Demographics & Risk Factors	Median Age (months)	73 (2-214)	156 (3-384)	0.024
	Presence of Comorbidity (%)	15 (21.1)	9 (47.4)	<0.001
	BMI >25 kg/m^2 (%)	6 (8.5)	5 (26.3)	0.018
Laboratory Findings	Lymphopenia (<1500/μL)	-	28 (31.1)	-
	CRP >5 mg/L	-	31 (34.4)	-
	D-dimer >500 ng/mL	-	34 (37.8)	-
Treatment Categories	Conservative Management (%)	66 (73.3)	Median Duration: 4 (1-8)	-
	Antiviral Therapy (%)	15 (16.7)	Median Duration: 5 (5-10)	-
	Combination Therapy* (%)	9 (10.0)	Median Duration: 7 (5-21)	-
Comorbidity Impacts	Respiratory (%)	8 (8.9)	Moderate severity risk	Median Stay: 4 days
	Cardiac (%)	2 (2.2)	High severity risk	Median Stay: 12 days
	Neurological (%)	6 (6.7)	Moderate severity risk	Median Stay: 5 days
	Haematologic/Oncologic (%)	3 (3.3)	High severity risk	Median Stay: 10 days
	Metabolic/Endocrine (%)	6 (6.7)	Moderate severity risk	Median Stay: 6 days

All p-values for severity associations are <0.05. Treatment duration varies significantly based on disease severity and complications. Comorbidities significantly impact both disease severity and length of stay. Statistical tests: Chi-square, Fisher's exact test, Mann-Whitney U test. OR = Odds Ratio, CI = Confidence Interval, AB = Antibiotic, O_2 = Oxygen therapy.

a slower response to treatment. In normal weight children, the disease showed a more stable course and the median length of hospitalisation was 5 days. Patients categorised as underweight generally had a milder disease course, shorter hospitalisation (median 4 days) and fewer complications. Laboratory and imaging findings varied according to BMI. Among obese or overweight patients, 54.5% had elevated CRP and 36.4% had abnormal chest radiographs. These rates were 36.6% and 34.1% in normal weight patients and 26.3% and 23.7% in lean patients, respectively. These findings suggest that BMI is directly related to disease severity. In the contact history analysis, a milder disease course was generally observed in patients who were infected from the same household. Patients in this group were hospitalised for a shorter period (median 4 days) and had lower complication rates (7.7%). Patients infected outside the same household had a more severe disease course, longer hospitalisation (median 6 days) and higher complication rates (15.8%). In patients without a history of contact, the most severe disease presentations and the highest treatment requirements were recorded (Table 5) (Fig. 2).

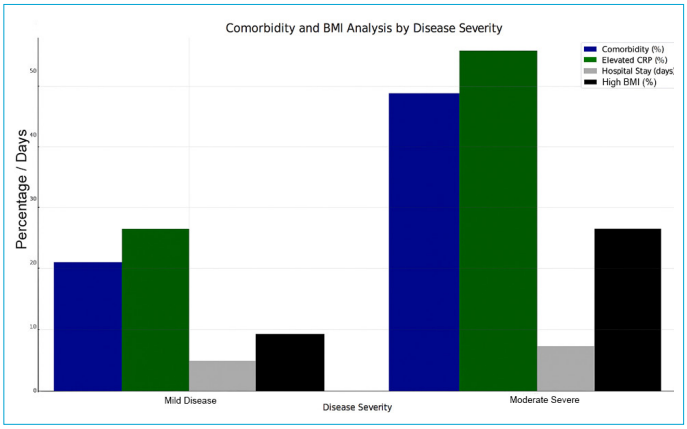

Figure 2. Comorbidity and BMI Analysis by Disease Severity: This figure illustrates the relationship between comorbidities, elevated CRP levels, hospital stay duration, and high BMI (%) across mild and moderate-severe COVID-19 cases in pediatric patients. It highlights the increased prevalence of comorbidities, inflammatory markers, and prolonged hospitalization in more severe cases.

Discussion

Our investigation showed that the clinical progression of COVID-19 in children varies greatly between different age categories. Observation showed that younger children are more vulnerable to the infection and need more aggressive treatment approaches while with increasing age, children become less ill and require less treatment in fact, it is more likely that the disease will take a milder course. In addition to respiratory involvement, gastrointestinal symptoms such as diarrhea and vomiting have also been reported in pediatric patients, especially in younger age groups, and should be considered during clinical assessment.[6] This suggests that the clinical picture of COVID-19 infection in children is likely to be age specific and that management strategies should be developed bearing such differences in mind. The results of the study also, like many others, from evidence point out that children at the age of infanthood should be monitored very carefully and that the management plan to guide them should be age oriented.

Table 5. Nutritional status, clinical course, laboratory/imaging, and contact analysis

Category	Parameter	Underweight (n=38)	Normal (n=41)	Overweight/Obese (n=11)	p
BMI Characteristics	Mean BMI±SD	16.2±1.8	21.3±1.9	29.3±4.1	<0.001
	Height-for-age Normal (%)	89.5	92.7	90.9	0.042
Clinical Course	Mild Disease (%)	78.9	70.7	63.6	-
	Moderate-Severe Disease (%)	21.1	29.3	36.4	-
	Median Hospital Stay (days)	4 (1-12)	5 (1-15)	6 (2-21)	-
Laboratory/Imaging	Elevated CRP (%)	26.3	36.6	54.5	-
	Abnormal Chest X-ray (%)	23.7	34.1	36.4	-
Contact Analysis	Mild Disease (%)	76.9 (Household)	68.4 (Non-household)	-	0.028
	Complications (%)	7.7 (Household)	15.8 (Non-household)	-	0.008
	Median Stay (days)	4 (1-15) (Household)	6 (2-21) (Non-household)	-	0.002
Treatment Needs	Conservative Management (%)	76.9 (Household)	65.8 (Non-household)	-	-
	Additional Therapy* (%)	23.1 (Household)	34.2 (Non-household)	-	-

All p-values <0.05 are considered significant. Overweight and obese categories were combined due to small numbers. Contact categories were simplified to highlight key differences.

The data we obtained in this study clearly reveal the differences in the clinical course and treatment of COVID-19 among paediatric age groups. Especially in the 0-2 age group, fever and respiratory distress were the most common symptoms. Antibiotic and antiviral use rates are higher in this age group and hospitalisation periods are significantly longer than other age groups. Similarly, a systematic review by Patel et al.[7] reported that 27% of children hospitalised due to COVID-19 were infants under one year of age and this group required respiratory support at a higher rate.[7] In older age groups (5-12 and 12+ years), the disease generally has a milder course. Swann et al.[8] in a large cohort study conducted in the United Kingdom, it was found that COVID-19 had a milder course and hospitalisation rates were lower in children over 10 years of age.[8] In addition, the increase in the rate of antibiotic-free treatment with increasing age suggests that the immune response to infection in this age group may be more effective. Irfan et al.[9] also emphasised that the rates of severe clinical picture decreased with increasing age and treatment requirements were lower.[9] Our findings show that younger age groups are more vulnerable to COVID-19 infection and require more medical intervention. Interestingly, some studies have suggested a bimodal distribution in disease severity, with both infants (<1 year) and adolescents being at higher risk for severe illness.[10] This situation reveals that the management of infection and treatment strategies should be planned more carefully, especially in the 0-2 age group.

In our study, lymphopenia was frequently observed in severe COVID-19 cases. This observation has been reported in the literature quite extensively. In particular, low lymphocyte levels have been shown to be strongly associated with disease severity and activation of the inflammatory process.[11] In addition, it has been previously reported that C-reactive protein (CRP), ferritin and D-dimer levels tend to increase with increasing age and these parameters correlate with the severity of the disease.[12] From our analysis, it was noted that inflammation markers were elevated in patients above the age of 12. This supports the progressive inflammatory response mechanisms of COVID-19.[13] In our patients in the high-risk group, elevated levels of at least two inflammatory markers were observed. Similarly, it has been emphasised that ferritin levels exceeding 1000 ng/mL is an important marker for predicting severe respiratory distress and other complications.[14] The inclusion of inflammatory markers such as ferritin might be helpful in the diagnosis process and treatment as suggested by the result. In addition, it has been widely supported in the literature that high D-dimer levels are associated with thrombotic complications and increase the risk of mortality.[11, 13] Our study outcomes underscore the need to pay attention to tracking laboratory indicators, particularly with regard to their use in the control of complicated cases. Both in estimating the prognosis and devising personalised treatment plans, these parameters serve as useful indicators.

In our study, it was found that obese or overweight children had more severe disease, hospital stay was longer in this group, and the rates of elevated CRP (54.5%) and abnormal chest radiography (36.4%) were higher. In addition, it was observed that the disease had a milder course in normal or underweight children. The relationship between obesity and the clinical severity of COVID-19 is widely sup-

ported in the literature. According to the meta-analysis of Singh et al.,[15] obesity increases the risk of severe disease by 52% in COVID-19 patients (RR=1.52, 95% CI 1.41-1.63). Likewise, in the systematic review of Nour and Altintas,[16] it was stated that the prevalence of obesity increased significantly due to the quarantine conditions in the pandemic, which increased the complications associated with COVID-19. Elevated CRP levels and high rates of abnormal chest radiographs suggest that the inflammatory response may be more intense in obese individuals. In the study by Choi et al.,[17] it was stated that inflammatory markers were higher in obese patients and this increased the risk of worsening of the disease. In addition, weakening of the immune system and increased inflammatory response in obese children may prolong hospitalisation and lead to more serious consequences of the disease.[14] The milder symptoms in normal or underweight individuals may be due to the metabolic and immunological advantages of these individuals.[18] This finding suggests that maintaining a healthy BMI, especially in children, may favourably affect the clinical course of COVID-19.

In our study, the rate of comorbidities was high in the moderate to severe disease group (47.4%). It was observed that cardiac diseases prolonged the hospital stay (12 days) and haematological or oncological comorbidities negatively affected the prognosis. In addition, recovery time was longer in comorbid patients (mean 7.3 days). These findings are consistent with previous studies in the literature. For example, Zhang et al.[19] reported that patients with comorbidities had a poor prognosis and increased disease severity after COVID-19 infection. In the same study, it was emphasised that especially cardiovascular diseases were associated with high mortality rates.[19] Similarly, Notarte et al.[20] reported that infection was more severe in individuals with haematological malignancy and immune response was suppressed in this group.[20] In a large-scale study conducted by Woodruff et al.[21] in a paediatric patient population, it was reported that children with comorbidities had higher intensive care needs and increased mortality rates.[21] Martin et al.[22] showed that haematological comorbidities increased the severity of COVID-19 disease in children and the recovery time of these patients was significantly prolonged.[22] These findings emphasise the significant effect of the presence of comorbidities on the clinical course of COVID-19 infection. We find literature that supports this claim, plus it illustrates once more the impact various forms of comorbidities have on clinical results.

Our study has some limitations. The single centre and relatively limited number of patients may affect the generalisability of our findings. In addition, there may have been difficulties in accessing some clinical data due to its retrospective design. However, our study also has strengths. Considerable understanding of the progression of COVID-19 disease in children was obtained from a meticulous assessment of the patient's clinical details, laboratory tests, and imaging studies. In particular age group specific analyses have been instrumental in appreciating the differing features of the disease in varies age categories. Targeted multicenter research focusing on a larger sample set is imperative for confirming the data in the future. Simultaneously, the prolonged consequences of the sickness and the potential developable late-stage problems ought to be addressed in follow-up studies. In more focused terms, future work may study in more details the risk determinants as well as compare the treatment modalities for their effectiveness.

Conclusion

Our study revealed that the course of COVID-19 in children shows significant differences between age groups. The fact that the disease is more severe and requires more intensive treatment especially in younger age groups emphasises the necessity of special approaches for this age group. Moreover, the existence of comorbidities and nutritional elements seem to have considerable impact on the disease's progression. Based on the information presented, age-tailored management protocols and risk assessment during COVID-19 treatment in pediatric patients is necessary. In-depth studies will at some point be able to validate these conclusions and enhance the transitions towards different suppositions. In this way, more effective management of COVID-19 infection in the pediatric age group can be achieved and the negative consequences of the disease can be minimised.

Disclosures

Ethics Committee Approval: The study protocol was approved by the Ethics Committee of Prof. Dr. Cemil Taşcıoğlu City Hospital (Approval Date: 08.11.2021, Number: 390).

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References

1. Russell CD, Lone NI, Baillie JK. Comorbidities, multimorbidity and COVID-19. Nat Med 2023;29:334–43. [Crossref]
2. Vidya G, Kalpana M, Roja K, Nitin JA, Taranikanti M. Pathophysiology and Clinical Presentation of COVID-19 in Children: Systematic Review of the Literature. Maedica (Bucur) 2021;16:499–506. [Crossref]
3. Stopyra L, Kowalik A, Stala J, Majchrzak I, Szebla J, Jakosz M, et al. The Age-Related Course of COVID-19 in Paediatric Patients-1405 Cases in a Single Centre. J Clin Med 2022;11:7347. [Crossref]
4. Cianfarani S, Pampanini V. The Impact of Stress on Health in Childhood and Adolescence in the Era of the COVID-19 Pandemic. Horm Res Paediatr 2023;96:83–7. [Crossref]
5. Kokcu Karadag SI, Erdeniz EH, Ozkan E, Yildiran A. One Virus, Two Diseases: Evaluation of Clinical and Immunological Differences in Covid-19 and Multisystem Inflammatory Syndrome Cases. Med Bull Sisli Etfal Hosp 2024;58:82–90. [Crossref]
6. Sinaei, R., Hosseininasab, A., Abbaslou, P Zeinali M, Iranmanesh E, Sinaei R et al. Gastrointestinal and hepatic manifestations among hospitalized COVID-19 children. BMC Pediatr 2025;25:308. [Crossref]
7. Patel NA. Paediatric COVID-19: Systematic review of the literature. Am J Otolaryngol 2020;41:102573. [Crossref]
8. Swann OV, Holden KA, Turtle L, Pollock L, Fairfield CJ, Drake TM, et al. Clinical characteristics of children and young people admitted to hospital with covid-19 in the United Kingdom: prospective multicentre observational cohort study. BMJ 2020;370:m3249. [Crossref]
9. Irfan O, Muttalib F, Tang K, Jiang L, Lassi ZS, Bhutta Z. Clinical characteristics, treatment and outcomes of paediatric COVID-19: a systematic review and meta-analysis. Arch Dis Child 2021;106:440–8. [Crossref]
10. Al-Iede M, Dannoun M, Al-Ammouri I, Al-Zayadneh E, Daher A, Albaramki J, et al. COVID-19 Infection in Pediatric Patients Presenting to a Tertiary Center in Jordan: Clinical Characteristics and Age-Related Patterns. J Clin Med 2025; 14:2577. [Crossref]
11. Poluektova VB, Sankova MV, Volchkova EV, Larina SN, Maloletneva NV, Shabalina OYu, et al. The possibility of predicting the COVID-19 severity by clinical-laboratory criteria taking into account the SARS-CoV-2 strain: An analytical review. Epidemiol Infect Dis 2024;29:192–203. [Crossref]
12. Kaushal K, Kaur H, Sarma P, Bhattacharyya A, Sharma DJ, Prajapat M, et al. Serum ferritin as a predictive biomarker in COVID-19: A systematic review, meta-analysis and meta-regression analysis. J Crit Care 2022;67:172–81. [Crossref]
13. Simadibrata DM, Pandhita BA, Ananta ME, Tango T. Platelet-to-lymphocyte ratio, a novel biomarker to predict the severity of COVID-19 patients: A systematic review and meta-analysis. J Intensive Care Soc 2022;23:20–6. [Crossref]
14. Guarino M, Perna B, Maritati M, Remelli F, Trevisan C, Spampinato MD, et al. Presepsin levels and COVID-19 severity: A systematic review and meta-analysis. Clin Exp Med 2023;23:993–1002. [Crossref]
15. Singh R, Rathore SS, Khan H, Karale S, Chawla Y, Iqbal K, et al. Association of obesity with COVID-19 severity and mortality: An updated systematic review, meta-analysis, and meta-regression. Front Endocrinol (Lausanne) 2022;13:780872. [Crossref]
16. Nour TY, Altintas KH. Effect of the COVID-19 pandemic on obesity and its risk factors: A systematic review. BMC Public Health 2023;23:1018. [Crossref]
17. Choi JH, Choi SH, Yun KW. Risk Factors for Severe COVID-19 in Children: A Systematic Review and Meta-Analysis. J Korean Med Sci 2022;37:e35. [Crossref]
18. Anderson LN, Yoshida-Montezuma Y, Dewart N, Jalil E, Khattar J, De Rubeis V, et al. Obesity and weight change during the COVID-19 pandemic in children and adults: A systematic review and meta-analysis. Obesity Rev 2023;24:e13550. [Crossref]
19. Zhang JJ, Dong X, Liu GH, Gao YD. Risk and Protective Factors for COVID-19 Morbidity, Severity, and Mortality. Clin Rev Allergy Immunol 2023;64:90–107. [Crossref]
20. Notarte KI, de Oliveira MHS, Peligro PJ, et al. Age, Sex, and Previous Comorbidities as Risk Factors Not Associated with SARS-CoV-2 Infection for Long COVID-19: A Systematic Review and Meta-Analysis. J Clin Med 2022;11:7314. [Crossref]
21. Woodruff RC, Campbell AP, Taylor CA, Chai SJ, Kawasaki B, Meek J, et al. Risk Factors for Severe COVID-19 in Children. Pediatrics 2022;149:e2021053418. [Crossref]
22. Martin B, DeWitt PE, Russell S, Anand A, Bradwell KR, Bremer C, et al. Characteristics, Outcomes, and Severity Risk Factors Associated With SARS-CoV-2 Infection Among Children in the US National COVID Cohort Collaborative. JAMA Netw Open 2022;5:e2143151. [Crossref]