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Original article

The manifestation of COVID 19 virus in children in Kirkuk city

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Abstract:

- ***Background*:** COVID-19 is a highly infectious disease that caused a global pandemic and significantly impacted children in Kirkuk city. This study aimed to assess the various clinical presentations, signs, and symptoms of COVID-19 in children in Kirkuk to facilitate early diagnosis and isolation.
- ***Methods:*** A community-based descriptive cross-sectional study was conducted on 120 children diagnosed with COVID-19 via PCR testing from nasal swabs. The children presented to the Pediatric Hospital in Kirkuk and private clinics between June 2020 and July 2021. Data were collected using a structured questionnaire detailing each child's clinical condition.
- ***Result:*** The findings revealed that children with COVID-19 presented with diverse symptoms, including fever, cough, nasal congestion, loss of smell or taste, and dyspnea. Gastrointestinal symptoms such as diarrhea, nausea, vomiting, and abdominal pain were also reported. Additional symptoms included headache, dizziness, muscle aches, and poor feeding.
- ***Conclusions:*** Children infected with COVID-19 may exhibit a wide range of respiratory, gastrointestinal, neurological, or non-specific symptoms. Early PCR testing through nasal swabs is essential for timely diagnosis, isolation, and appropriate treatment.
- **Keywords:** Children, neonate, COVID 19, Kirkuk

INTRODUCTION

Children can be infected with the COVID-19 virus; however, the severity and extent of illness generally appear to be less than in adults. As with most viral infections, fever is the most commonly reported symptom, followed by cough and altered taste. Notably, gastrointestinal symptoms such as abdominal pain, vomiting, and diarrhea have also been observed (1, 2).

In Kirkuk city, the number of COVID-19 cases began to rise in May 2020. With time, the spread escalated, culminating in a local pandemic. The infection affected a wide range of age groups, from neonates to older children, presenting with diverse manifestations (3, 4).

Although children can contract the virus similarly to adults, diagnosing pediatric cases can be particularly challenging due to often mild and non-specific symptoms. Despite this, infected children remain highly contagious and can transmit the virus to family members, especially those with chronic illnesses, putting them at risk of severe disease (5).

Even infants under one year of age are susceptible to COVID-19 and may develop serious complications, particularly those with underlying chronic conditions or weakened immune systems. In such cases, symptoms can be atypical (6).

Symptoms in older children can vary greatly by age group and may resemble common cold-like illnesses (e.g., sore throat, fever, cough, body aches) or gastrointestinal complaints such as nausea, vomiting, and diarrhea (7).

Raising awareness among families to seek immediate medical attention and PCR testing for their children when any of these symptoms arise is critical. Early diagnosis can prevent unnecessary treatments, enable proper management, reduce complications, and curb the spread of the virus (8).

This study aims to identify the most common signs and symptoms of COVID-19 among children across different age groups. These findings will support early diagnosis, guide clinical decision-making, and inform policies for timely isolation and management to control the pandemic and reduce its complications.

PATIENT and METHOD

This community-based descriptive cross-sectional study was conducted on children who presented to the Pediatric Hospital in Kirkuk city and private clinics between June 2020 and July 2021. A total of 120 children diagnosed with COVID-19 through polymerase chain reaction (PCR) testing of nasal swabs were included in the study.

Data were collected using a structured questionnaire designed to capture comprehensive information about each case. The questionnaire included items on age, presenting signs and symptoms, duration of illness, history of exposure to confirmed COVID-19 cases, and previous infection status.

Additional data were gathered on baseline laboratory investigations such as complete blood count (CBC), C-reactive protein (CRP), serum ferritin levels, and chest computed tomography (CT) findings. Information on any medications received prior to diagnosis was also recorded.

RESULTS

Socio-Demographic Characteristics

A total of 125 children were included in the study. As shown in Table 1, the majority of participants were male (n = 90, 72%), while females comprised 28% (n = 35) of the sample.

Table (1): Socio-demographic Characteristics of the Study Sample

Socio-demographic parameter		**Study sample N=125**	
		No	%
Sex	Female	35	28%
	Male	90	72%

Age Distribution

The children were categorized into four age groups. The highest proportion (30%) belonged to the 5–10 years age group (n = 35), followed by equal distributions of 25% in both the 1–5 years and >10 years groups (n = 30 each), and 20% were in the 1–12 months group (n = 30). A detailed breakdown is shown in Table 2.

Table 2: Age Distribution of the Sample

Age	Male	Female	Total	Percentage
1 - 12 months	21	9	30	20%
1 - 5 years	22	8	30	25%
5 - 10 years	25	10	35	30%
>10 years	20	10	30	25%
Total	88	37	125	100%

Clinical Manifestations of COVID-19

Fever was the most common clinical manifestation, observed in all cases (100%). Other frequent symptoms included cough (77%), vomiting (56%), and diarrhea (48%). Abdominal pain was reported in 40% of cases, while skin rash and gingivostomatitis were less common, reported in 7% and 14% of the sample, respectively (Table 3). Notably, gastrointestinal symptoms were prominent among children aged 1–5 years, particularly abdominal pain and vomiting.

Table 3: Clinical Manifestations of COVID-19 in Children

Age	Fever	Cough	Diarrhea	Abdominal pain	Vomiting	Skin rash	Gingivostomatitis
1-12 months	30	26	22	0	22	0	8
1-5 years	30	12	20	27	23	2	7
5-10 years	35	32	10	12	13	3	1
>10 years	30	27	8	11	12	4	2
Total	125	97	60	50	70	9	18
Percentage	100	77	48	40	56	7	14

Laboratory Investigation Findings

As illustrated in Table 4, the most prevalent laboratory abnormality was CRP level elevation (90%), followed by high ferritin levels (86%) and lymphopenia (85%). A lower white blood cell (WBC) count was found in 76% of the cases, and an elevated erythrocyte sedimentation rate (ESR) was noted in 72% of the children. These findings were consistently distributed across age groups, with the highest inflammatory markers observed in the 5–10 years group.

Table 4: Investigation Results Findings in Different Age Groups

Age	Lymphopenia	CRP level elevation	Low WBC count	High ESR	High ferritin level
1-12 months	22	23	20	18	23
1-5 years	25	27	22	20	26
5-10 years	33	34	28	30	34
>10 years	27	28	25	22	25
Total	106	112	95	90	108
Percentage	85%	90%	76%	72%	86%

Radiological Findings (CXR and CT Chest)

Radiological assessments revealed that 43% of children had pneumonic patches, while CT findings included moderate changes in 22% and mild changes in 15% of cases. Severe CT changes were identified in 6% of the children (Table 5). The 5–10 years age group exhibited the highest frequency of pneumonic patches and CT abnormalities, suggesting more extensive pulmonary involvement in this group.

Table 5: CXR and CT-Chest Findings

Age	Pneumonic patch	Mild CT changes	Moderate CT changes	Severe CT changes
1-12 months	11	2	7	2
1-5 years	16	6	7	3
5-10 years	18	8	8	2
>10 years	9	3	5	1
Total	54	19	27	8
Percentage	43%	15%	22%	6%

DISCUSSION

Although children can be infected with the coronavirus, their symptoms tend to be milder and may vary significantly depending on age group—from infants under 12 months to children over 10 years. This study explored the clinical features, laboratory findings, and chest CT scan results of COVID-19-infected children across different age groups in Kirkuk and compared these findings with similar international studies.

In our study, male children were more frequently affected than females. This observation aligns with other research, including that by Farhaan S. et al., which highlighted evidence from China and Europe suggesting higher incidence and mortality in males. A large study in the United States involving 2,500 children similarly reported greater susceptibility among males. The World Health Organization (WHO) also estimated that approximately 70% of COVID-19 cases were male (9, 10).

All pediatric age groups, from 1 month to over 10 years, were equally susceptible to infection. Nutritional status did not offer protection; however, symptoms appeared more severe in malnourished children. These findings are consistent with studies by Jonas F. Ludvigsson, Hasan Tezer, and Gulhan Karakaya Molla (11).

Globally, millions of children have been infected with COVID-19. The most commonly reported symptoms include fever and cough, followed by gastrointestinal

symptoms such as abdominal pain, vomiting, and diarrhea. These patterns were also observed in our study and are supported by findings from Xuefeng Ma et al. (12).

Interestingly, several patients presented with dermatological manifestations, including chilblain-like lesions, erythema multiforme, urticaria, and gingivostomatitis. These findings corroborate those reported by D. Andina et al. (13).

Laboratory investigations revealed lymphopenia, elevated C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), serum ferritin, and D-dimer levels in many patients. The severity of clinical symptoms appeared to correlate with these abnormal lab findings, consistent with results reported by Xuefeng Ma et al., E. Murillo-Zamora, and Stephanie Ward et al. (14, 15).

Chest CT scans showed varying degrees of pulmonary involvement—ranging from mild to severe. The extent of lung involvement tended to increase with age, with older children more likely to develop viral pneumonia. This finding agrees with observations reported by Tao Ai et al. (16).

In summary, this study found that male children were more frequently affected by COVID-19 than females. The most common clinical presentations were fever and cough, followed by gastrointestinal symptoms such as vomiting, diarrhea, and abdominal pain. In some cases, skin rashes and gingivostomatitis were also present. Laboratory abnormalities such as lymphopenia and elevated CRP were common, and

CT chest changes were more frequently seen in older children, although even infants under 12 months showed radiological evidence of infection.

CONCLUSION

COVID-19 can affect children across all age groups, with a wide range of clinical presentations that are often milder than in adults but still varied and occasionally severe. Fever and cough were the most common symptoms, followed by gastrointestinal complaints such as vomiting, diarrhea, and abdominal pain. Less frequent manifestations included dermatological changes and gingivostomatitis. Laboratory findings such as lymphopenia, elevated CRP, ferritin, and D-dimer levels were associated with more severe cases. Chest CT involvement, ranging from mild to severe, was observed more frequently in older children but also occurred in infants.

Male children were found to be more commonly affected than females, consistent with global trends. Malnutrition was associated with more severe symptoms, though it did not appear to increase susceptibility to infection. Early recognition of these diverse symptoms, prompt PCR testing, and timely intervention are essential to reduce transmission, avoid unnecessary treatments, and prevent complications.

This study highlights the importance of clinician and caregiver awareness of the varied presentations of COVID-19 in children to facilitate early diagnosis, appropriate management, and effective isolation strategies.

Ethical Clearance:

- Institutional approval was obtained from the administration of Kirkuk Pediatric Hospital.
- Verbal informed consent was obtained from all patients and their parents.

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Nil.

Conflicts of interest:

There are no conflicts of interest.

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