

## Epidemiological and clinical profile of COVID-positive children without comorbidities: Observations from a dedicated COVID hospital in East India

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### ABSTRACT

**Objective:** The objective of the study was to study the epidemiological and clinical profile of COVID-positive children without pre-existing comorbidities at a dedicated COVID care hospital in the eastern state of Jharkhand. **Materials and Methods:** This retrospective study was conducted at a COVID hospital of the eastern state of Jharkhand on children up to 18 years of age admitted between May 2020 and October 2020. The case files of all children, with a positive reverse transcription polymerase chain reaction (RT-PCR) report for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus, were reviewed, and among them, all children without comorbidities were enrolled and studied. Relevant demographic details, clinical presentation, examination findings, investigations, and treatment received, were collected. **Results:** Out of 70 children enrolled in the study, 41 were male with a sex ratio of 1.4:1 and a median age (interquartile range) of 14 (8–16.5) years. About 94.2% of children had a history of contact with a positive member from their own family. About 14.2% had a history of travel to an endemic zone. About 34.2% of children were completely asymptomatic and in rest of the children, cough (23.8%) followed by fever (20.0%) was the most predominant complaint. Most of the symptomatic children had mild disease (62.8%). There was no mortality and all children were successfully discharged. The mean duration of disease (based on RT-PCR status) was significantly lower in children up to 12 years of age in comparison to those older than 12 years. **Conclusion:** Family transmission is the major source of SARS-CoV-2 infection in children. Children can also serve as potential source of spread of infection in community. Age was the most important determinant of early recovery in pediatric population without comorbidities.

**Key words:** Children, Comorbidities, Coronavirus disease-19, Disease duration, Epidemiology, Pediatrics, Severe acute respiratory syndrome coronavirus 2


Although all humans are susceptible to severe acute respiratory syndrome coronavirus (SARS-CoV-2) viral infection, it does appear that coronavirus disease (COVID)-19 disease occurs less frequently and less severely in children than in adults. Reports of pediatric cases are increasing nonetheless [1-3]. However, we could not find any such study from this region so we planned this study to present the epidemiological and clinical profile of COVID-positive children without any comorbidity.

### MATERIALS AND METHODS

A retrospective observational study was conducted at Central Hospital, Ramgarh, dedicated COVID care hospital in the

eastern state of Jharkhand. We reviewed the case files of all patients <18 years of age admitted in our hospital from May 2020 to October 2020. Among them, those who tested positive for SARS-CoV-2 infection by reverse transcriptase polymerase chain reaction (RT-PCR) by nasopharyngeal swab without pre-existing comorbidities were included in the study. Children with pre-existing conditions such as malignancy, hematological conditions (sickle cell, thalassemia, and hemophilia), congenital heart disease, chronic lung disease, chronic kidney disease, and multiple congenital anomalies were excluded from the study.

Information of all enrolled patients were noted in a predesigned pro forma which included details such as age, sex, history of contact, history of travel to endemic area, presenting complaints, clinical examination, investigations, and treatment received. Total duration of disease was taken as the interval between first RT-PCR-positive reports to first RT-PCR-negative report. Data were entered into MS Excel and statistically analyzed using SPSS

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19. Descriptive statistical analysis was performed, and mean and standard deviation were calculated. Student's t-test was used to calculate the significance of difference between two means.

## RESULTS

A total of 70 children were enrolled for the study after applying the exclusion criteria. Median (interquartile range) age of presentation was 14 years (8–16.75 years), with M: F ratio of 1.4:1 (Table 1). Sixty-six (94.2%) children had contracted the disease from an infected family member; whereas in the rest of the cases, the family members were tested negative. Ten (14.2%) children had a history of travel to endemic zones. Twenty-four (34.2%) children were completely asymptomatic throughout their hospital stay and were kept admitted for the sole purpose of isolation to break the transmission chain. Cough was the most predominant complaint seen in 16 (23.8%) patients followed by fever in 14 (20.0%). GI symptoms like diarrhea were observed in 3 (4.2%) patients.

Antibiotics, antipyretics, and antitussives were given to 37 (52.8%), 19 (27.1%), and 16 (22.8%) children, respectively. Nine (12.8%) were given hydroxychloroquine (HCQ) in modified doses as per the guidelines prevalent at that time [1]. One child required steroid therapy, two children required oxygen support, and none required invasive ventilation. All were successfully discharged after getting declared negative in RTPCR test by nasopharyngeal swab.

The mean duration of disease was 14.44±4.17 days in admitted children. Twenty (28.5%) children recovered within 10 days of first RTPCR-positive result while the rest took more than 10 days. The mean duration of disease positivity in children up to 12 years was 12.48±3.73 days which was significantly ( $p=0.001$ ) lower than that in the children >12 years of age. Other parameters such as sex of child, family clustering of cases, symptoms, disease severity, and HCQ use did not have a significant impact on the duration of disease (Table 2).

## DISCUSSION

This study highlights the epidemiological and clinical characteristics of healthy children getting infected with SARS-CoV-2 and their possible impact on disease duration and progression. The sex ratio was skewed in the study population in favor of males. Similar findings have been reported in the previous studies from India and abroad [2,3]. Males may be more susceptible to COVID infection because of more expression of the angiotensin-converting enzyme receptors.

A majority of children contracted the disease from adults in their families. Similar family clustering of pediatric cases has been reported earlier [2-5]. However, children may get the disease from non-family members also and hence children should also be encouraged to follow precautions at a personal and social level. In an interesting finding, two children aged 4 and 6 years from the same family turned COVID positive while their parents were

**Table 1: Epidemiological and clinical characteristics of children with COVID-19 (n=70)**

Characteristics	n (%)
Total no. of patients	70
Age median (IQR)	14 years (8, 16.75)
Gender: Male/female	41/29 (1.4:1)
Mode of exposure	
From positive family members	66 (94.2)
Other than own family	4 (5.7%)
History of travel to endemic zone	10 (14.2)
Disease severity	
Mild	44 (62.8)
Moderate	2 (2.8)
Severe	0
Clinical features	
Asymptomatic	24 (34.2)
Cough	16 (23.8)
Fever	14 (20.0)
Stuffy nose	4 (5.7)
Nausea/vomiting	4 (5.7)
Diarrhea	3 (4.2)
Body ache/headache	3 (4.2)
Fatigue	2 (2.8)
Treatment	
Antipyretics/analgesics	19 (27.1)
Antibiotics	37 (52.8)
Antitussives	16 (22.8)
HCQ	9 (12.8)
Steroid	1 (1.4)
Oxygen support	2 (2.8)
Nutritional support	70 (100)
Invasive ventilation	0
Duration of disease positivity by RTPCR	
<10 days	20 (28.5)
>10 days	50 (71.5)
Outcome	
Discharge	70 (100)
Death	0

RTPCR: Reverse transcription polymerase chain reaction, IQR: Interquartile range, COVID: Coronavirus disease, HCQ: Hydroxychloroquine

COVID negative. Mother stayed with both of them during entire treatment period (12 days), but she never turned positive. This reflects the fact that children may harbor the virus for a prolonged time causing them to remain RTPCR positive, but their infectivity appears less. This observation, however, needs to be confirmed with a larger sample size.

In our study, 34.2% of children were asymptomatic, which is more than 23% of that found in a meta-analysis done previously [6]. This may be because we excluded children with comorbidities in our study sample. Respiratory symptom like cough followed by fever was the most common complaint among symptomatic children as also found in other studies [6-8]. GI symptoms at 4.2% were comparable to other studies from India [2]. Similar to

**Table 2: Comparison of mean duration of disease in relation to various demographic and clinical parameters**

Parameter	Number of patients n (%)	Duration of disease Mean (SD)	p-value
Age			
Up to 12 years	27 (38.5)	12.4 (3.7)	0.001
More than 12 years	43 (61.4)	15.5 (4.1)	
Sex			
Male	41 (58.5)	14.5 (4.2)	0.38
Female	29 (41.5)	14.3 (4.3)	
Source of infection			
Family clustering	66 (94.2)	14.4 (4.2)	0.40
No family clustering	4 (5.7)	15.0 (2.2)	
Disease severity			
Mild	44 (62.8)	15.0 (4.1)	0.24
Moderate	2 (2.8)	17.0 (1.4)	
Clinical features			
Asymptomatic	24 (34.2)	13.9 (4.3)	0.28
Symptomatic	46 (65.8)	15.0 (3.9)	
Respiratory symptoms			
Present	20 (28.7)	13.6 (4.7)	0.15
Absent	50 (71.3)	14.7 (3.91)	
HCQ use			
With HCQ	9 (12.8)	15.5 (4.3)	0.19
Without HCQ	71 (87.2)	14.3 (3.8)	

HCQ: Hydroxychloroquine

the previous studies [3,4,6,9], a majority of symptomatic patients (95.6%) had mild disease and none of them were critically ill, reinforcing the fact that COVID-19 in children is indeed a mild disease. The exact reason for the same is not clearly understood till now, although several hypotheses have been proposed [10,11].

The mean duration of disease in our study as decided by RTPCR test status was 14 days. There was no difference in disease duration among males and females although males have been thought to harbor more severe disease [3,12,13]. Presenting symptoms and disease severity at the time of admission had no significant relation with viral clearance. This finding appears to be in contrast to the previous studies, where signs and symptoms of lower respiratory tract infection were associated with a more severe disease course [3,13]. In our study, a majority of symptomatic children had mild disease and very few were seriously affected.

Children >12 years of age who were offered HCQ did not show any benefit with regard to disease duration which is in consistency with the previous studies where HCQ was not found beneficial [14,15]. Children up to 12 years of age took significantly lesser time to return to a negative state in comparison to adolescents. This may be because adolescents older than 12 years partly behave like adults and are no longer benefitted by the unknown mechanisms thought to be protective for younger children. However, the exact cause needs to be explored.

## CONCLUSION

A substantial mode of transmission of infection in children is from an adult either inside or outside the family. This age group poses a unique challenge, and further studies with a large sample size are required to characterize the disease to formulate health guidelines specifically suitable for them. Till then, children should be taught to inculcate universal hygienic practices in their routine life, such as social distancing, frequent hand wash, and use of masks (as far as practical) to break the chain of transmission of the virus.

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