


Paediatric COVID-19: Milder Presentation—A Silver Lining in Dark Cloud

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ABSTRACT

Objective: To assess the clinico-epidemiological profile of paediatric patients with Corona virus disease 2019 (COVID-19) infection during the pandemic.

Methods: Clinico-epidemiological and laboratory profile of children between 1 month and 14 years were studied between 15 May and 31 July 2020, who had positive nasopharyngeal and oropharyngeal swab for severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) by reverse transcriptase–polymerase chain reaction (RT-PCR).

Results: A total of 30 children with median age of 10.5 years (8 months to 14 years) were included in the present study. Sixty percent were boys. Twenty-seven (90%) belonged to an urban area and all 30 children were from a containment area. All were belonging to Kuppuswamy upper lower and lower socioeconomic class. Twenty-one (70%) were asymptomatic. All children had a positive household contact. Symptomatic children had only mild symptoms of fever, dry cough and rhinitis. All were fully vaccinated as per age. Nine (30%) had anaemia. The mean leucocyte count was 7470 ± 2427 (4300–14 100). Leucocytosis was seen in 3 (9%) children. C-reactive protein was found to be raised in only 4 (13%) children. We did not find alteration in sense of smell and taste. No mortality was reported.

Conclusion: COVID-19 in paediatric patients is usually mild. Severe acute respiratory infection is not a major manifestation of COVID 19 infection in children. All children infected by the novel Corona virus-2 in this study, have a documented household contact.

KEYWORDS: COVID 19, clinico-epidemiological profile, SARS-CoV-2, children

INTRODUCTION

Corona virus disease 2019 (COVID-19) is a pandemic which the world is currently facing. It is caused by a novel Corona Virus viz. severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). The Corona virus infection originated in China and has spread to more than 200 countries of the world. India had its first case reported in February 2020

from Kerala. Till 13 September 2020, the cases in India have reached up to 47.5 lakhs and many paediatric patients are coming with respiratory complaints with suspected COVID-19 infection. To date, not much information is available about COVID-19 in the paediatric population. The aim of this study is to analyse the clinical features, epidemiology and laboratory profile of children with COVID-19.

METHODS

This was an observational study which was conducted in a paediatric COVID-19 tertiary care centre, Gandhi Medical College, Bhopal, MP, between 15 May and 31 July 2020. We took prior approval from institutional ethics committee. All children between 1 month and 14 years of age who tested positive by reverse transcriptase–polymerase chain reaction (RT-PCR) for both nasopharyngeal and oropharyngeal swab, were included in this study. Written consent was taken from the parents of all children. A predesigned and pretested proforma, which included detail information regarding socio-demographic profile, travel and exposure history, clinical examination, underlying medical condition and vaccination history, was filled. After clinical examination, children were categorized as per degree of severity according to standard criteria [1]. All children were checked for alteration in sense of smell and taste using coconut oil, chocolates and flavoured milk as per the Directorate Health Services, Madhya Pradesh, India protocol.

Laboratory investigations were done according to the hospital protocol. All children had undergone complete haemogram, C-reactive protein (CRP), liver function test, renal function test, chest X-ray, serum electrolytes and other relevant investigations. All children were managed as per hospital protocol. Children were discharged as per World Health Organization (WHO) guidelines [2].

Statistical analysis

Data were captured using Microsoft Excel and analysed using IBM SPSS Software version 20. Categorical data were grouped and expressed as frequency and percentage, whereas numerical data were expressed as mean and standard deviation (SD). Unpaired Student's *T*-test was applied to assess the differences in mean between the presence or absence of symptoms. Severity of illness was correlated with total leucocyte count (TLC), neutrophil/lymphocyte ratio (NLR) and CRP levels. A *p*-value <0.05 was considered significant.

RESULTS

One hundred and twenty children presented to us with severe acute respiratory infection (SARI) during

the study period. All tested negative for SARS-CoV-2 infection by RT-PCR. Detailed study of 30 children who tested positive by RT-PCR for SARS-CoV-2, admitted during the same period along with their one or more relatives, was done. Median age was 10.5 ± 4.49 years (range 8 months to 14 years). Boys 18 (60%) outnumbered the girls 12 (40%). Twenty-six (87%) domiciled in an urban area and only 4 (13%) resided in a rural area. All were from a containment area, i.e. specific geographic areas where COVID-19 cases are found in large numbers decided by district administration. Initially, a 1 km radius was declared as containment zone, and another 2 km as buffer zone. The area to be covered in containment zones is gradually declining with increasing number of cases [3]. As per the modified Kuppuswamy scale, which is used to measure socioeconomic status in rural and urban areas based on education, occupation of the family head along with income per month of the family, all were belonging to upper lower and lower socioeconomic class [4]. Only 1 (3%) child had history of travel to an affected area in past 14 days (Table 1).

Twenty-one (70%) children were asymptomatic and 9 (30%) children were symptomatic. All 30 children had a positive family member at home. Symptomatic children had only mild symptoms of fever, dry cough and rhinitis. All were fully vaccinated as per universal immunization programme, as per age. Anaemia was seen in 9 (30%) children. Five (17%) children had mild and 4 (13%) had moderate anaemia [5] (Table 2). Leucocytosis was seen in 2 (7%) of children who tested positive. Mean TLC in patients with fever and rhinitis was higher as compared to those without such symptoms but the observed difference was statistically insignificant. However, mean TLC count was significantly higher in patients who presented with cough ($p < 0.05$). The mean (SD) leucocyte count was 7470 ± 2427 (range 4300–14 100), ($T = 2.73$, $p = 0.01$), showed a significant correlation with symptoms of illness. Observed mean NLR was statistically insignificant ($p > 0.05$). None had thrombocytopenia or thrombocytosis.

CRP was found to be raised in only 4 (13%) children, all were symptomatic. CRP showed a significant correlation with fever ($p = 0.048$). Both NLR ($T = 1.44$, $p = 0.16$), and CRP ($T = 0.36$,

TABLE 1: Epidemiological variables of SARS-CoV-2 positive children

Sociodemographic variable	N = 30	Percentage
Age in years (8.62 ± 4.49)		
≤1	4	13
1–4	3	10
5–9	5	17
9–12	12	40
>12	6	20
Gender		
Male	18	60
Female	12	40
Kuppuswamy classification		
Upper lower	10	33
Lower	20	67
<hr/>		
General	N = 30	Percentage
<hr/>		
Underlying medical condition		
Yes	0	0
No	30	100
Vaccinated as per age		
Yes	30	100
No	0	0
History of exposure		
Yes	30	100
No	0	0
Relation to child in case of exposure		
Parents	21	70
Sibling	1	3
Uncle	7	24
Grand mother	1	3
Travel history		
Yes	1	3
No	29	97

$p = 0.725$) did not show any correlation with symptoms of the illness. In present study, statistically significant positive correlation ($R^2 = 0.21$; $p = 0.01$) was observed between illness and TLC ($p < 0.05$).

Chest radiograph was done in all children, none of the children showed any chest radiograph abnormality. There was no alteration in the sense of taste and smell in any of the patient. No mortality was reported. The prevalence of COVID-19 infection in the paediatric population was found to be 3% as total 1012 COVID-19 positive patients were admitted in

TABLE 2: Clinical and laboratory parameters of SARS-CoV-2 positive children

Clinical characteristics	N = 30	Percentage
<hr/>		
Severity of illness		
Asymptomatic	21	70
Mild	9	30
Moderate	0	0
Severe	0	0
Symptoms		
Fever	9	30
Runny nose	3	10
Cough	8	27
Headache	1	3
<hr/>		
Investigations	N = 30	Percentage
<hr/>		
Hb (11.39 ± 1.57) in g/dl		
>11	21	70
10–11	5	17
7–10	4	13
<7	0	0
TLC ($N 7470 \pm 2427$)		
4000–11 000	28	93
>11 000	2	7
NLR ($N 2.21 \pm 1.07$)		
≤1	4	13
1–3	17	57
>3	9	30
CRP ($N 4.57 \pm 3.04$) in mg/l		
<6	26	87
>6	4	13
Chest X-ray		
Normal	30	100
Abnormal	0	0

Hb, haemoglobin; N, study number; NLR, neutrophil/lymphocyte ratio; TLC, total leucocyte count.

the institution, including the paediatric patients during the study period.

DISCUSSION

In our study, all children were from lower socioeconomic class, all had positive close family member at home that was COVID-19 positive. A similar pattern was seen in other studies [6, 7]. All children were from a containment zone and all had exposure to a positive household contact. The majority of children

were asymptomatic and only few had mild symptoms. A multicentric study also showed milder form of the disease in children [8]. A recent meta-analysis has also shown that most of the patients have mild to moderate disease (96%) with only 1% of all the symptomatic paediatric cases being critically sick [9]. In children who were symptomatic, fever cough and rhinitis were common symptoms; similar findings being reported in a study from China [10]. In this study, there was no mortality. According to the COVID-19 Data summary—NYC Health, mortality in children is less than 1% [11].

As anaemia is very common in Indian children, our study reports anaemia in 9 (30%) children; 5 (17%) had mild and 4 (13%) moderate anaemia [12]. Leucocytosis was seen in only 2 (7%) children who were symptomatic. Leucocytosis shows a significant correlation with severity of disease. CRP was found to be raised only in 4 (13%) children and it did not show any correlation with severity of disease as it shows in adults.

In our study, we did not find any child having alteration in sense of taste or smell. Few case reports on complete loss of smell and changes in taste are available for paediatric COVID-19 patients. Most of the reports that have been published on a complete or partial loss of taste or smell are in adult patients with COVID-19. In an International Multicenter Study, they found that only 10/27 (37%) of the paediatric cases presented with smell and/or, taste disorders [13]. The children with these disorders were 15–17 years of age. Mak *et al.* [14] reported total loss of smell in three children aged 14, 15 and 17 years, who tested positive for the virus, and two of them also reported changes in taste. Another study reported that a 17-year-old girl with beta-thalassemia, who tested positive for the virus, presented with a total loss of smell and taste for 8 days [15]. In all these studies the children, who found to have change in smell and taste, were above 14 years of age. In our study, we included children upto 14 years of age and children who were symptomatic (9), 5 children were below one year of age.

CONCLUSION

COVID-19 infection in paediatric patients usually manifests in a milder form. SARI is not a major

clinical manifestation of COVID 19 in the paediatric patients. In our study, all children infected by the novel Corona virus were shown to have a positive documented household contact.

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REFERENCES

1. Guidelines on Clinical Management of COVID-19. Government of India Ministry of Health & Family Welfare Directorate General of Health Services (EMR Division), pp. 3–5. <https://www.mohfw.gov.in/pdf/GuidelinesonClinicalManagementofCOVID1912020.pdf> (18 August 2020, date last accessed).
2. WHO, Criteria for releasing COVID-19 patients from isolation Scientific brief 17 June 2020.
3. Containment and surveillance manual for supervisors in containment zones. Ministry of Health and Family Welfare, Government of India. <https://www.mohfw.gov.in/pdf/ContainmentandSurveillanceManualforSupervisorsincontainmentzones.pdf> (20 September 2020, date last accessed).
4. Wani RT. Socioeconomic status scales-modified Kuppuswamy and UdaiPareekh's scale updated for 2019. *J Family Med Prim Care* 2019;8:1846–9.
5. Demayer EM, Dallman P, Gurney JM, *et al.* Preventing and Controlling Iron Deficiency Anemia through Primary Health Care: A Guide for Health Administrators and Programme Managers. World Health Organization, 1989; pp. 8–9. https://www.who.int/nutrition/publications/micronutrients/anaemia_iron_deficiency/9241542497.pdf?ua=1 (18 August 2020, date last accessed).
6. Coronavirus Disease (COVID-19). Centers for Disease Control and Prevention.2020. <http://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/racial-ethnic-minorities.html> (20 June 2020, date last accessed).
7. Sarangi B, Reddy V, Oswal JS, *et al.* Epidemiological and clinical characteristics of COVID-19 in Indian children in the initial phase of the pandemic. *Indian Pediatr* 2020;57:914–17.
8. Zimmermann P, Curtis N. Coronavirus infections in children including COVID-19: an overview of the epidemiology, clinical features, diagnosis, treatment and prevention options in children. *Pediatr Infect Dis J* 2020; 39:355–68.
9. Meena J, Yadav J, Saini L, *et al.* Clinical features and outcome of SARS-CoV-2infection in children: a systematic review and meta-analysis. *Indian Pediatr* 2020;57: 820–6.

10. Wang XF, Yuan J, Zheng YJ, *et al.* [Retracted: clinical and epidemiological characteristics of 34 children with 2019 novel coronavirus infection in Shenzhen]. *Zhonghua Er Ke Za Zhi* 2020;58:E008.
11. COVID-19: Data Summary—NYC Health. <https://www1.nyc.gov/site/doh/covid/covid-19-data.page> (17 August 2020, date last accessed).
12. Indian Institute for Population Sciences (IIPS) and MoHFW. National Family Health Survey—4. 2017. <http://rchiips.org/nfhs/pdf/NFHS4/India.pdf> (17 September 2020, date last accessed).
13. Qiu C, Cui C, Hautefort C, *et al.* Olfactory and gustatory dysfunction as an early identifier of COVID-19 in adults and children: an International Multicenter Study. *Otolaryngol Head Neck Surg* 2020;163:714–21.
14. Mak PQ, Chung KS, Wong JS, *et al.* Anosmia and ageusia: not an uncommon presentation of COVID-19 infection in children and adolescents. *Pediatr Infect Dis J* 2020;39:e199–200.
15. Marhaeni W, Wijaya AB, Kusumaningtyas P, *et al.* Thalassemic child presenting with anosmia due to COVID-19. *Indian J Pediatr* 2020;87:750.