

A Study of Demographic and Clinical Spectrum of COVID-19 in an Indian Pediatric Population Assessed by Teleconsultation

Shweta Singh¹, Abhishek Singh^{2*}, Virendra Yadav³, Bhawna Kohli⁴

¹Associate Professor, Dept. of Pediatrics, Rama Medical College and Hospital, Hapur, UP, India.

²Assistant Professor, Dept. of Medicine, Noida International Institute of Medical Sciences, Greater Noida, UP, India.

³Assistant Professor, Dept. of Pediatrics, Santosh Medical College and Hospital, Ghaziabad, UP, India.

⁴Professor & Head, Dept. of Pediatrics, Rama Medical College and Hospital, Hapur, UP, India.

ABSTRACT

Objective: To analyze the demographic and clinical features of COVID-19 in pediatric population by teleconsultation.

Setting: Children availing teleconsultation through the pediatric outpatient department of Pediatrics, Rama Medical College & hospital, Hapur.

Duration: Three months (1st February to 1st May 2021)

Design: Longitudinal Observational Study

Participants: RTPCR positive for SARS-CoV19 children availing teleconsultation from pediatric OPD by a preset Questionnaire of involved symptoms and signs using video consultation followed by case appropriate investigation and management.

Results: Out of the total 4270 children enrolled 3920 were RTPCR positive for covid-19 comprising of 59% boys. The peak incidence was found around 8 years of age (48%) with most of them having mild clinical symptoms (90%) especially a combination of respiratory and gastrointestinal symptoms (57%). The clinical symptoms were in correlation with the abnormalities of laboratory tests including leucopenia, NLR, CRP and CORADS score and severity index of CT scan of chest.

Conclusion: The enigma of COVID19 manifestations in children is a challenge to healthcare providers. Varied

presentations warrant an early suspicion and, in most cases, only symptomatic treatment, good nutrition and strict isolation is sufficient for management. Parent education and healthcare service provider skill development in information technology field is beneficial to both the healthcare service providers and recipients in current pandemic scenario.

Keywords: COVID19, RTPCR, Teleconsultation, NLR, CORADS.

*Correspondence to:

Dr. Abhishek Singh,
Assistant Professor,
Department of Medicine,
Noida International Institute of Medical Sciences,
Greater Noida, UP, India.

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INTRODUCTION

Amidst the pandemic of COVID-19, our country is having the second series of lockdown with number of cumulative cases 2.4 crores as on day of compiling the data with daily new cases of 3,43,000.¹ The mode of teleconsultations with all the prerequisites of medicolegal formalities and clinical precision is the demand of the time.² We therefore, describe the spectrum of demographic and clinical characteristics of COVID-19 in pediatric out-patients at a tertiary care center treated through teleconsultation.

METHODS

We conducted a prospective study in the outpatient department of a pediatric tertiary care center from February 1 to May 1, 2021. We included children from 1 month to 18 years of age, with a history in the week before inclusion of at least one of the following

criteria: a) one respiratory symptom, b) one gastrointestinal symptom or c) fever and recent exposure to a confirmed COVID-19 case in last 14 days duration. Neonates and children with severe COVID -19 disease involving MISC were excluded from the study.³

All cases were tested with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) reverse transcriptase-polymerase chain reaction (RT-PCR) nasopharyngeal swabs. For the patients who met the inclusion criteria, we looked for symptoms present prior to evaluation at the emergency department and signs at the physical exploration by the preset Questionnaire, and the information was gathered by attending physicians. Gastrointestinal symptoms were defined as the presence of diarrhea, vomiting, nausea or abdominal pain. We defined pneumonia as the

presence of one of the following: (a) increased rate of breathing >60 in first 2 months, >50 in 2 months -2 years, >40 in 2 years – 5 years, >30 in 5 years to 18 years, (b) increased work of breathing or (c) oximetry <93%. Investigations were done as per working guidelines³ including complete blood count, C-reactive protein, serum ferritin, liver function test, renal function test, Lactate dehydrogenase, interleukin-6, D-dimer and when necessary Plain

CT scan of chest according to the clinical severity of the disease. Prior approval was taken from the institutional ethics committee. Digital written informed consent was taken from the parents of all children by digital media.

The data were analyzed using the Statistical Package for Social Sciences (SPSS) software version 18.0 (SPSS Inc., Chicago-II, USA).

Table 1: Demographic and Clinical Characteristics of Pediatric patients With COVID – 19 (N=3920)

| Characteristics | Number (%) | |
|--------------------------|-------------------------------|-----------|
| Age | 1month -2 years | 196(5) |
| | 2years-5years | 314(8) |
| | 5years-10 years | 1,372(35) |
| | 10years-14years | 1,176(30) |
| | 14years-18years | 862(22) |
| Gender | Boys | 2,313(59) |
| | Girls | 1,607(41) |
| Type of illness | Asymptomatic | 628(16) |
| | Mild disease | 2,900(74) |
| | Moderate disease | 392(10) |
| Types of symptoms | Only respiratory | 784(20) |
| | Only gastrointestinal | 588(15) |
| | Both | 2234(57) |
| | Without anyone of them | 314(8) |

Table II: Symptoms and signs of COVID-19 in Children (n=3920)

| Symptoms | Number (percentage%) |
|--------------------------------------|----------------------|
| Time of symptoms onset(hours) | 18 (Median) |
| Fever | 3,684(94) |
| Excessive crying (<2years) | 192(98) |
| Dry cough | 3,292(84) |
| Rhinitis | 1,019(26) |
| Sore throat | 1,372(35) |
| Headache | 2,979(76) |
| Abdominal pain | 2,273 (58) |
| Conjunctival hyperemia | 588 (15) |
| Vomiting | 2,900(74) |
| Diarrhea | 1,450(37) |
| Shortness of breath | 470(12) |
| Fatigue | 3,645(93) |
| Hyporexia | 236(6) |
| Myalgia | 2,587(66) |
| Dysgeusia | 1,019(26) |
| Arthralgia | 2,234(57) |
| Productive cough | 470(12) |
| Rash | 509(13) |
| Hoarseness | 313(8) |
| Excessive daytime sleepiness | 3,253(83) |
| Hyposmia | 940(24) |

Table III: Laboratory findings in children with COVID19 (n=3292)

| Laboratory test | Number (%) of abnormal results at 1 week | Number (%) of abnormal results at 2 weeks |
|-----------------------------|--|---|
| Complete blood count | | |
| Anemia | 2,436(74) | 2,238(68) |
| Leucocytosis | 856(26) | 296(9) |
| Leucopenia | 1,086(33) | 66(2) |
| Lymphopenia | 664(21) | 49(1.5) |
| Lymphocytosis | 526(16) | 230(7) |
| AST (≥ 40 IU/L) | 3,160(96) | 1,448(44) |
| ALT (≥ 40 IU/L) | 3,193(97) | 1,349(41) |
| Ferritin (>150 ng/ml) | 2,699(82) | 197(6) |
| LDH ($.290$ IU/L) | 3,160(96) | 592(18) |
| CRP (≤ 5 mg/l) | 3,336(98) | 1,086(33) |
| IL6 (<7 ng/ml) | 3,062(93) | 362(11) |
| D-dimer (<500 ng/ml) | 164(5) | 26(0.8) |
| CT scan Chest | 329(10) | 263(8) |

AST-Aspartate aminotransferase, ALT- Alanine aminotransferase, LDH-Lactic dehydrogenase, CRP-C-reactive protein, IL6-Interleukin-6, CT scan-Computed tomography

RESULTS

A total of 4270 children were enrolled in the study of which 3920 (82%) were RTPCR positive for SARS-CoV2 and consisted of the actual study population. These 3920 children were followed telephonically till 3 weeks duration for their course of illness and treatment. The average interval of time from onset of symptoms to relief (more than 3 days without fever, resolution of cough, RTPCR turning negative) was around 16 days. There were 2,313 (59%) boys and the mean age of presentation was 8 years. Majority of cases had history of positive household contact 94% (3684) of which 2700 (82%) of family members were having mild illness and 2% were having severe illness.

Among the cases 628(16%) were asymptomatic while mild and moderate illness was found in 2900 (74%) and 392 (10%) respectively. There was combined presentation of respiratory and gastrointestinal symptoms in about 57% (2234) cases (table I). All children responded well to the treatment given as per national guidelines and improved dramatically on 3 weeks follow up³. None of the child was hospitalized neither there was any mortality among the treated children.

The mean time interval from the onset of symptoms to presentation in the OPD was 18 hours. The most common presenting symptoms were fever (99%), fatigue (93%), dry cough (84%), excessive daytime sleepiness (83%), headache (76%), pain abdomen (58%), vomiting (74%), loose-motions (37%) and myalgia (66%) (Table II). There was pre-existing chronic illness- Thalassemia Major in 1, Downs Syndrome 3, Cerebral palsy 8, G6PD-deficiency-2 and Asthma in 240 cases.

The mild and moderate cases (84% of the total) were subjected to laboratory tests at the end of the 1st and 2nd week follow up. They uniformly showed progressively improving biochemical abnormalities on follow up as their clinical improvement occurred. None of the child was put on anticoagulant therapy though a few of moderate severity received steroids for appropriate duration in

adequate doses. CT scan of chest was done in only moderate cases (n=392) of which nearly all showed abnormalities of mild to moderate severity as predicted by CORADS and CT severity index which was well correlated with clinical severity (Table III).

DISCUSSION

The enigma of presentation of SARS-CoV-2 infection in children is a challenge to pediatricians. Many case series have been published; however, most of them are retrospective and collect few clinical features.^{4,5} Broader prospective studies are needed for the description of myriad presentation of the symptoms in pediatric population. Our study included amalgamation of digital information technology and clinical acumen for the demonstration of the epidemiological profile and clinical features of COVID-19 in children.

We found that a total of 82% children enrolled in the study were positive for SARS-CoV-2 by RTPCR which is well in accordance with the sensitivity value of the test.⁶

Most of them reported contact with a positive household contact. Most children were from lower socioeconomic groups reflecting overcrowding, paucity of proper social distancing and hand hygiene facilities. Majority of them were either asymptomatic or having milder form of the disease which is comparable with other studies.⁷ Various hypotheses have been proposed for the lesser disease severity in children, though a definite answer is still awaited.⁸

None of the age groups were immune to the disease but there was clustering of cases in around 8 years of age which could be attributed to the inability of this age group to comprehend and follow social distancing norms and their frequent close contact with parents.⁹ With increasing parent education and awareness through various social media the average time interval of presentation from the start of the first symptoms have been as

short as 18 hours which resulted in prompt initiation of appropriate management and early isolation and therefore decreasing the rapid spread and better prognosis.¹⁰

Also, there was a sharp spike in daily number of cases registered in the months of the April and May, 2021 (from 5 to 6 cases per day at beginning of March to up to as high as 150 cases per day registered at April end) which was same as rapid increase in number of cases per day as observed in the daily toll of our country.¹¹

The most common presenting symptoms were fever (94%), easy fatigability (93%) followed by cough, headache and vomiting.¹² Adult patients with digestive symptoms without respiratory symptoms are rare, while in pediatric population it seems to be more frequent.¹³

Presence of nonspecific signs and symptoms, and digestive symptoms, even in the absence of respiratory symptoms, should raise the suspicion of COVID-19. Loss of taste and smell in adults has been reported in up to half of cases and proposed as an important discriminatory symptom.¹⁴ Both hyposmia and dysgeusia are reported in our study which is also reflected in dramatically decreased oral acceptance in them, so these symptoms are not rare in pediatric population. The lesser reporting of chemosensory dysfunction in children could be due to their inability to express the loss of the sensation because of their age.¹⁵

Leucopenia was seen in 27 % of cases and lymphopenia in 16% with no evidence of thrombocytopenia or eosinopenia while in adults hematological abnormalities include leucopenia with associated neutrophilia, lymphopenia, eosinopenia and thrombocytopenia. Increasing NLR {neutrophil-lymphocyte ratio ($r=0.35$, $P=0.01$)} and LMR {lymphocyte-monocyte ratio ($r=0.31$, $P=0.03$)} showed a significant correlation with the severity of the illness.¹⁶ The value of CRP was uniformly raised in the cases with progressive declining value as the recovery ensued.¹⁷ The CT scan of chest has shown pictures in reflection to the disease severity.^{18,19}

Being a study conducted by the concept of evolving tele medication, we had limitations of direct physical examination of child which might have missed many vital clinical findings²⁰ which would have been important in picking the signs which give early guidance for treatment. Nevertheless, the same has turned as an advantage for health care providers by decreasing the risk of exposure to them, and also to the parents by easier & quicker mode of availability health facilities there by decreasing their risk of exposure, transport, expenses and saving time. This digital platform is thus, a cost and time effective model of health care services which is appreciated in present circumstances. Our findings may require further validation by development of more refined information technology and parent education about teleconsultation.

CONCLUSION

In conclusion, our study reflects that the myriad of signs symptoms of SARS CoV-2 infection in children requires importance of the nonspecific signs and symptoms along with common occurrence of gastrointestinal symptoms for suspicion of early diagnosis. It also emphasizes that milder and asymptomatic pediatric Covid cases can very well be managed at home by teleconsultation.

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