



Clinical Profile and Outcomes of Sars Covid-19 Positive Pediatric Patients Admitted at A Tertiary Care Hospital, In North India (Punjab)

Baljinder kaur¹Surinder Kaur^{1*}, Anju Singla², Tanya Thakkar³

Professor and Head of Department¹Assistant Professor¹, Senior Resident², Assistant Professor³
Department of pediatrics, Government Medical College, Patiala, Punjab

***Corresponding Author:**

Dr Surinder Kaur

Assistant Professor, Department of Pediatrics, Government Medical College Patiala, Punjab

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract-

Background: Corona virus disease 2019 (COVID-19) was caused by SARS COV-2, a newly emergent corona virus, that was first recognized in Wuhan, China in December2019. Clinical presentation was not much known in children at the beginning of pandemic. Thus knowledge of clinical presentation and outcomes of Covid-19 SRS virus infection in children is crucial for optimizing care of children infected with COVID-19 SRS virus. The present study was planned to understand the clinical profile and outcomes of covid-19 virus positive pediatrics patients.

Methods: -We retrospectively reviewed hospital record of pediatrics patients (aged 1 month to 15 years) admitted at Govt. Medical College and Rajindera hospital, Patiala with positive RTPCR test for Covid-19SRS virus from March 2020 to February 2021.

Results: A total of 2949 COVID-19 SRS virus positive patients were admitted to isolation ward between March 2020 to Feb 2021.Out of this total, only 40(1.35%) were pediatrics patients (aged from one month to15years). Majority of children 33 (75%) were asymptomatic or mildly symptomatic and only 7(17.5%) patients presented with Severe Acute Respiratory Illness. 6(15%) pediatrics patients were shifted to intensive care unit in view of severe illness and required ventilator support for ARDS and 3(7.5%) children lost their lives. 31(77.5%) patients had contact with Covid-19 positive patients, primarily from households (either parents or Grandparents). Majority of children 26 (65%) stayed in hospital for 11 to 20 days.

Conclusion: Majority of children was asymptomatic or presented with mild symptoms. Covid-19 RTPCR positive adults were household contacts in most of children. Mortality was more in children with associated co-morbidities.

Keywords: -Clinical profile, Severe Acute Respiratory Illness (SARI), Positive contacts cases, Pediatrics, Acute Respiratory Distress Syndrome(ARDS), Diabetic Ketoacidosis (DKA), and Intensive Care Unit (ICU).

INTRODUCTION

Corona virus disease 2019 (COVID-19) was caused by SARS COV-2, a newly emergent corona virus, that was first recognized in Wuhan, China in December2019(1). Genetic sequencing of the virus suggested that it is a beta corona virus closely linked to the SARS virus. In India,the first laboratory-

confirmed case of COVID-19 was reported from Kerala on January 30, 2020. Till March 31, 2020, a total of 2,245 cases and 56 deaths were reported in India(2),but only few cases were reported from pediatrics population ,and that too with mild symptoms.In India, the initial COVID-19 testing

strategy included people who had international travel history with or without symptoms, contacts of laboratory-confirmed COVID-19 patients and symptomatic healthcare workers managing respiratory distress/severe acute respiratory illness (SARI) patients/ Covid-19 disease patients(3). WHO recommended countries to leverage the existing hospital-based SARI sites to complement the COVID-19 surveillance activities (3). This further assisted in monitoring the intensity of COVID-19 transmission over time and geographical spread and to assess the severity of the disease in the country (4). The COVID-19 pandemic had created unprecedented need for information as it was the cause of significant mortality. There was a need for rapidly disseminating information about symptoms prevalence and intensity, resistance or susceptibility to symptom control and mode of death (4). Following the evolution of the COVID-19 epidemic, hospitalized SARI patients were included as part of the routine testing strategy (2). SARI surveillance was initiated in the early phase of the COVID-19 outbreak in India. Shedding of SARS-CoV-2 was highest in the upper respiratory tract (URT) early in the course of the disease that was within first three days before the onset of symptoms(3). This period also known as Pre symptomatic period and some infected persons can be contagious(5). The incubation period for COVID – 19 on an average was 5 to 6 days but can be up to 14 days. The median time was 20 days (interquartile range is 17-24 days). Symptomatic transmission was referred to as transmission of SARS-CoV-2 virus from persons with symptoms to close contact through respiratory droplets, by direct contact with infected persons, nasopharyngeal secretions, or by contact with contaminated objects and surfaces (6). The longest time the virus was observed to fall off was 37 days(7). While most people with COVID-19 develop only mild (40%) or moderate (40%) disease, approximately 15% develop severe disease that required hospitalization and oxygen support. 5% had critical disease with complication such as respiratory failure, acute respiratory distress syndrome (ARDS), sepsis and septic shock, thrombo-embolism and/or multiple organ failure, including acute kidney injury, Acute liver failure and cardiac injury(7). Patient with high sequential organ failure scores and D dimer >1 ug/L at admission had high mortality rates (7). Children accounts for only 1-5% of diagnosed

COVID-19 cases. There was few data on the clinical presentations of COVID-19 disease in children. Clinical manifestations of COVID-19 were generally milder in children as compared to adults⁸ and presents mainly with cough and fever, and co-infections had also been observed (8). It was mainly, but not obligatorily characterized by respiratory illness, fever, flu- like illness or abdominal symptom like vomiting and diarrhea. Relatively few cases had been reported of infants confirmed with positive RTPCR test for COVID-19 virus (9). From the beginning of COVID-19 pandemic, it became evident that the spectrum of clinical manifestations was different in children than in adults. Virus clearance was reported to be prolonged up to 30 days in pediatrics age group (10). Children may need long quarantine period(11). As children kept on moving from one parent to the other and to grandparents, they could be primary spreaders also(12). Thus aim of the present study is to describe a broader clinical spectrum of COVID-19 virus infection and its outcome in children so that these children can be identified earlier, treated properly to prevent mortality.

METHODOLOGY:

Study setting-A retrospective study was conducted, amongst pediatrics patients (aged 1 month to 15 years of age) who had COVID-19 virus infection, admitted at a public sector tertiary care hospital located in North India, Punjab, from March 2020 to February 2021.

Selection of cases: All children who had a contact with confirmed case -A person with laboratory confirmation of COVID 19 virus infection (RTPCR positive for Covid-19 virus), irrespective of clinical signs and symptoms. OR close contact- living in the same household with a COVID-19 virus infected case OR having had direct physical contact with a COVID-19 virus infected case or his/her infectious secretions OR who was in a closed environment or had face to face contact with a COVID-19 positive case at a distance of within 2 meters including air travels also (13).

Data collection: Hospital record of Pediatrics patients diagnosed with Covid-19 virus infection reviewed retrospectively to collect information on demographic profile e.g., age, sex, history of present illness (e.g. sudden onset fever, cough, sore throat, shortness of breath during the preceding week to 10 days). Further data was also captured on progress of disease, length

of hospital stay and outcome of these patients. Data was also collected regarding past history of any chronic illness(es), e.g., any chronic respiratory diseases like Bronchial asthma, Tuberculosis. or History of Diabetes Mellitus, Chronic cardiac disease, Chronic neurological or neuromuscular disease, Hematological disorders, Immunodeficiency, including Human Immunodeficiency Virus (HIV). Depending upon their clinical presentations patients were categorized into mild, moderate, severe disease as per Punjab Government and WHO guidelines (13).

Asymptomatic –Children admitted with positive RTPCR for Covid-19 virus but no complaints.

Mild illness-symptomatic patients meeting the case definition for covid-19 without evidence of viral pneumonia or hypoxia.

Moderate disease. -Children with non-severe pneumonia who had cough or difficulty breathing + fast breathing but no danger signs.

Severe disease -Children with cough or difficulty in breathing, plus at least one of the following: central cyanosis or SpO₂ < 90%, severe respiratory distress (e.g., grunting, very severe chest indrawing) OR signs of pneumonia with a general danger sign.

Course during Hospital stay -All the asymptomatic children were closely monitored for development of any symptoms like fever, cough, running nose or GIT symptoms. Symptomatic cases monitored for worsening / improvement of existing signs and symptoms. Vital signs i.e., Temperature, Heart rate, Respiratory rate, Spo₂ and Blood pressure were recorded every 4-6 hourly in all children. Parents of all children were advised regarding maintenance of general hygiene especially hand hygiene. Good nutritious diet was provided to all patients. Symptomatic treatment was given to mildly symptomatic children. No blood sample testing was done in these children. Patients with moderate to severe disease were shifted to ICU. Their vitals were monitored every 2 hourly. Blood samples were sent for routine biochemical tests, as well as for special tests like CRP, D-dimer, serum Procalcitonin and serum ferritin levels. Radiological imaging was also done like chest x-ray, CT chest, ultrasound chest and abdomen. Depending upon patient's general condition and progress of disease, these tests were repeated

every 24-48 hourly. Further treatment was planned accordingly.

Depending on patient's Spo₂ levels, oxygen therapy was given either via nasal cannula and face mask. In cases with severe respiratory distress, ventilator support was given. Medication was also planned as per patient's general condition and existing covid-19 treatment protocols (3,13).

Discharge criteria-Repeat RTPCR test for covid-19 was sent after 14 days of 1st positive RTPCR test. if this test was negative another RTPCR was repeated within 24 hours and if this test was also negative then patient was discharged with advice of home isolation for another 15 days. (13)

Data Analysis. Data was analyzed using percentage, range, mean, standard deviation. Chi square test was used for comparison of various parameters. Multivariate regression analysis was done for determining the association between various factors and $p < 0.05$ was considered statistically significant. SPSS software was used for data entry and analysis.

RESULTS: A total of 2949 COVID-19 virus RTPCR positive patients were admitted to isolation ward of Government Medical College and Rajindera Hospital, between March 2020 to February 2021. Out of this total, only 40(1.35%) were Pediatrics patients (one month to 15 years of age). Majority (77.5%) of children were admitted directly to isolation ward as a contact case of COVID-19 virus RTPCR positive adults. 2(5%) children were referred in with RTPCR positive for COVID-19 virus with severe disease. 17.5% patients were shifted from pediatric emergency ward as suspected cases of COVID-19 virus and later their RTPCR test was positive. Majority of children were male and only 37.5% were females. Maximum number of children were between 6 – 10 years of age group. Only 2(5%) patients were below 1 year of age. (Table 1)

Most of the children had household contact with Covid-19 virus RTPCR positive adults (either parents or Grandparents). 33 (82.5%) children were asymptomatic or mildly symptomatic. Majority of symptomatic children (40%-50%) presented with mild cough, fever and nasal discharge. Only 2-3 patients presented with GIT symptoms. 10% patients were admitted with Jaundice, out of this, 2 patients had

hepatic encephalopathy. 25% children were admitted with difficulty in breathing. They were given oxygen inhalation to maintain their Spo₂ levels > 94 %. 15% children were diagnosed with moderate to severe disease, shifted to Intensive Care Unit, required ventilator support in view of their severe illness and acute respiratory distress syndrome. Within 48 to 72 hours of admission, 3 (7.5%) children lost their lives. (Table 2)

Mild disease symptoms were more common in 6-10 years of age group. Severe disease symptoms like difficulty in breathing, sepsis, septic shock and Intensive care unit admissions were more common in 11-15 years age group. (Table 3) . Mortality was more in male children. (Table 4).

ICU admissions were equal in both the genders Out of these 40 COVID-19 virus RTPCR positive children, 7 (17.5%) patients had co-morbidities like bronchial asthma in 3(7.5%) patient, tuberculosis in 2(5%) children and one tuberculosis patient was HIV positive also. 2(5%) patient was admitted with type I Diabetes with diabetic ketoacidosis. (Figure 1)

Outcome of patients: 15% Pediatrics patients were shifted to ICU, required ventilator support in view of severe illness and acute respiratory distress syndrome. Out of these 3 (7.5%) patients lost their lives and 3(7.5%) recovered completely and discharged in satisfactory conditions. Majority of patients 65% were sent home within 11-20 days of admission. 9(22.5%) patients had hospital stay of 21-30 days and only one child was discharged after 30 days because her RTPCR test was still positive (Table 5).

DISCUSSION:

The clinical suspicion of COVID-19 virus infection in children remains a challenge for physicians worldwide. Many case series which were published show variable results. A broader description of disease is of paramount importance for clinical suspicion of COVID-19 virus infection. Although our study is a retrospective study, it explored a wider clinical spectrum in a heterogenous population of pediatrics patients.

It is important to highlight that this study captured data from children who were admitted and managed at a tertiary care hospital. So our study population primarily represent patients with more severe end of disease.

As in adult population the most common presenting features of COVID-19 disease is SARI (Severe Acute Respiratory Illness) but most children were asymptomatic or mildly symptomatic. Symptomatic children (40%-50%) presented with mild cough, fever and nasal discharge only. Mild disease symptoms like Fever, cough, nasal discharge, vomiting, pain abdomen and jaundice was more common in 6-10 years of age group. Severe disease symptoms like difficulty in breathing, ICU admissions, ventilator requirement, sepsis, septic shock were more common in 11-15 years age group. 7 (17.5%) patients had co-morbidities like bronchial asthma in 3(7.5%) patient, tuberculosis in 2(5%) children and one tuberculosis patient was HIV positive also. 2(5%) patient was admitted with type I Diabetes with diabetic ketoacidosis.

In our study majority of children were males (62.5%), it can be due male gender preference in this region of the country. In contrast male children were 46% in Moroccan⁸ and 52% in US /CANADA study¹⁰ but In a study from Spain majority of study patients were females⁽¹⁵⁾.

. Median age of study population was 7 yrs, 13 yrs. (4.2 – 16.6) 10 and 10 –14 yrs. (16,17) Similar results were obtained in our study. Maximum number (40 %) of children who were RTPCR positive were between 6 – 10 years of age group.

Most of the children were asymptomatic or had mild symptoms like Pain abdomen, vomiting and diarrhea⁹. Only few (7.5%) children presented with Jaundice and progressed to hepatic encephalopathy. Similar results were obtained in Moroccan study and study in China.

Because of Covid-19 Pandemic of protocols, all RTPCR positive patients were admitted in hospital to contain further infection and were discharged after obtaining 2 RTPCR negative samples 48 hours apart 14 days after 1st RTPCR positive sample¹⁴. This was the reason that average duration of hospital stay was 11-20 days in our study and in other studies also. In a study 4 children were positive even at 28th day of first RTPCR covid-19 positive test¹⁴. But in our study only 1(2.5%) child was positive even at 30th day of first positive RTPCR test for covid-19 virus.

Children are more infective than adults (3). As children used to move from one parent to other parent and to grandparents, early detection of covid-19 virus

infection in them is of utmost importance to prevent infection in other family members (2).

Children with underlying co-morbidities presented with severe respiratory distress and respiratory failure and 3(7.5%) patients lost their life in our study. Similar results were obtained in a study from Morocco also. Difference in results was reported in US/Canada study where 83% children had co-morbid conditions and 73% children presented with severe disease, 38% required invasive ventilation, and hospital mortality rate was 4.2 %.(16,17).

Clinicians should recognize that clinical spectrum of Covid-19 virus infection is different than from adults (14). Most of children in our study were asymptomatic or had mild symptoms only (15). Clinicians should be

highly suspicious for the disease in children with underlying co-morbidities, so that early diagnosis and intervention can be lifesaving.

Conclusions; The study highlights that majority of RTPCR positive Covid-19 virus infected children were asymptomatic or presented with mild symptoms. Severe disease and Mortality were more in children with associated co-morbidities. Early identification and treatment in these children can be lifesaving as they had already compromised immune system. Covid-19 RTPCR positive adults were household contacts in most of children. As children are more infective than adults, they can be source of infection also. so early detection of disease in children is crucial to contain further spread of infection.

Table 1. Age and Gender wise distribution of RTPCR positive for Covid -19 virus children admitted at GMC,RH,Patiala.

Age	1month to 11 months	1year to 5 years	6years to 10 years	11 years to 15 years	Total
Sex Female	0(0%)	4 (50%)	7 (43.8%)	4 (28.6%)	15(37.5%)
Male	2 (100%)	4 (50%)	9 (56.3%)	10 (71.4%)	25(62.5%)
Total	2 (5%)	8 (20%)	16(40%)	14 (35%)	40(100%)

Table 2 Frequency of Clinical features and their outcome in RTPCR positive Covid -19 virus infected study population.

Age	1month to 11 months	Frequency	%
		2	5
Age	1-5 years	8	20
	6-10 years	16	40
	11-15 years	14	35
	Age in years (Mean±SD)		2.88±1.181
Length of stay in study hospital (in days)	1-10 days	4	10
	11-20 days	27	67.5
	21 -30 days	8	20
	More than 30 days	1	2.5

Length of stay in days (Mean±SD) (Mean±SD)			2.125. ±.5633
Gender	Male	25	62.5
	Female	15	37.5
Fever	Yes	8	20
	No	32	80
Cough	Yes	10	25
	No	30	75
Nasal Discharge	No	36	90
	Yes	4	10
Jaundice	No	37	92.5
	Yes	3	7.5
Positive Contacts	No	9	22.5
	Yes	31	77.5
Vomitting	No	37	92.5
	Yes	3	7.5
Diarrhoea and Pain Abdomen	No	38	95
	Yes	2	5
Breathlessness	No	30	75
	Yes	10	25
Oxygen inhalation	No	30	75
	Yes	10	25
ICU care	No	34	85
	Yes	6	15
Ventilator Support	No	34	85
	Yes	6	15
Sepsis	No	37	92.5
	Yes	3	7.5
Septic shock	No	38	95
	Yes	2	5
Expired	No	37	92.5
	Yes	3	7.5

Table 3 Age wise distribution of clinical features of RTPCR positive for Covid -19 virus children

Age	1month to 11 months		1year to 5 years		6years to 10 years		11 years to 15 years		Total	
	N	%	N	%	N	%	N	%	N	%
Fever	1	12.5	2	25	4	50	1	12.5	8	20
Cough	1	10	1	10	4	40	4	40	10	25
Nasal discharge	1	25	0	0	2	50	1	25	4	10
Vomiting	0	0	0	0	2	66.7	1	33.3	3	7.5
Pain abdomen	0	0	0	0	2	100	0	0	2	5
Diarrhea	0	0	2	100	0	0	0	0	2	5
Jaundice	0	0	0	0	3	75	1	25	4	10
Sepsis	0	0	0	0	0	0	3	21.4	3	7.5
Septic shock	0	0	0	0	0	0	2	14.2	2	5
Breathlessness	1	10	1	10	4	40	4	40	10	25
Oxygen inhalation	1	10	1	10	4	40	4	40	10	25
ICU admission	1	16.7	1	16.7	2	33.3	2	33.3	6	15
Ventilator support	0	0	0	0	2	33.3	4	66.6	6	15
Expired	0	0	0	0	0	0	3	21.4	3	7.5
Covid-19 RTPCR contacts	2	6.5	7	22.6	12	38.7	10	32.3	31	77.5

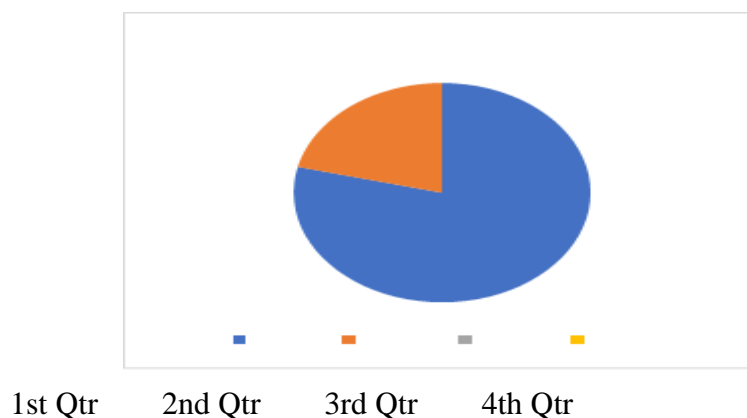
Table 4; Gender wise distribution of clinical features and their outcome in study population.

Symptoms		Male		Female		Total	
		N	%	N	%	N	%
Total number of patients		25	100	15	100	40	100
Fever		4	16	4	26.6	8	20
Nasal discharge		2	8	2	13.3	4	10
Cough		6	24	4	26.6	10	25
Vomiting		1	4	2	13.3	3	7.5
Diarrhea		1	4	1	6.6	2	5
Pain abdomen		0	0	1	6.6	1	2.5
Breathlessness		7	28	3	20	10	25
Oxygen inhalation		7	28	3	20	10	25
ICU		3	12	3	20	6	15
Ventilator support		3	12	3	20	6	15
Expired		2	8	1	6.6	3	7.5
Positive contacts		17	68	14	93.3	31	77.5
Jaundice		2	8	1	6.6	3	7.5
Length of Hospital stay	upto 10 days	2	8	2	13.3	4	10
	11 to 20 days	19	76	8	53.3	27	67.5
	21 to 30 days	4	16	4	26.7	8	20
	More than 30 days	0	0	1	6.7	1	2.5
Sepsis		1	32.3	2	67.7	3	7.5
Septic shock		1	50	1	50	2	5

Table 5 Outcome of study population

Outcome	Number	Percentage
Discharged	37	92.7
Referred out	0	0
Expired	3	7.5

Distribution of Co-morbid Conditions in study population



Bibliography-

1. Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. Vital surveillances: the epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) – China. *China CDC Weekly*. 2020;2(8):113-22.
2. Ministry of Health & Family Welfare, Government of India. COVID-19 India update. Available from: <https://www.mohfw.gov.in/>, accessed on March 31, 2020.
3. Indian Council of Medical Research. Revised Strategy of COVID19 Testing in India (Version 3, dated 20/03/2020). New Delhi: ICMR; 2020. Available from: https://icmr.nic.in/sites/default/files/upload_documents/2020-03-20_covid19_test_v3.pdf, accessed on March 30, 2020
4. Global Surveillance for human infection with coronavirus disease (COVID-2019), Interim guidance, Geneva, World Health Organization, 2020. ([https://www.who.int/publicationsdetail/global-surveillance-for-human-infection-with-novel-coronavirus-\(2019-ncov\)](https://www.who.int/publicationsdetail/global-surveillance-for-human-infection-with-novel-coronavirus-(2019-ncov))).
5. Wei WE, Li Z, Chiew CJ, Yong SE, Toh MP, Lee VJ. Presymptomatic Transmission of SARS-CoV-2 - Singapore, January 23-March 16, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(14):411-5. Epub 2020/04/10.
6. Liu Y, Yan LM, Wan L, Xiang TX, Le A, Liu JM, et al. Viral dynamics in mild and severe cases of COVID-19. *Lancet Infect Dis*. 2020. Epub 2020/03/23.
7. F. Zhou, T. Yu, R. Du et al., “Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study,” *The Lancet*, vol. 395, no. 10229, pp. 1054–1062, 2020. View at: [Publisher Site](#) | [Google Scholar](#)
8. Cai J, Xu J, Lin D, Yang Z, Xu L, Qu Z, et al. A case series of children with 2019 novel coronavirus infection: clinical and epidemiological features. *Clinical Infect Dis*. 2020. Epub 2020/03/01.
9. Wei M, Yuan J, Liu Y, Fu T, Yu X, Zhang Z, J. Novel coronavirus infection in hospitalized infants under 1 year of age in China *JAMA*. 2020; <https://doi.org/10.1001/jama.2020.2131>

10. K EL FAKIRI, H NASSIH, I AIT SAB, G DRAISS and M BOUSKRAOUI Epidemiology and clinical features of Coronavirus Disease 2019 in Moroccan Children; *Indian Pediatr.* 2020; 57(9); 808-810.
11. Yu P, Zhu J, Zhang Z, Han Y, Huang L. A familial cluster of infection associated with the 2019 novel coronavirus indicating potential person-to-person transmission during the incubation period. *J Infect Dis.* 2020. Epub 2020/02/19.
12. Pan X, Chen D, Xia Y, Wu X, Li T, Ou X, et al. Asymptomatic cases in a family cluster with SARS-CoV-2 infection. *Lancet Infect Dis.* 2020; 20(4): 410-Epub
13. WHO Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected: interim guidance, 13 March 2020.
14. Lara S. Shekerdemian, MD, MHA; Nabihah R. Mahmood, MD; Katie K. Wolfe, MD; et al; Characteristics and Outcomes of Children with Corona virus Disease 2019 (COVID -19) Infection Admitted to US and Canadian Pediatric Intensive Care Units *JAMA Pediatr.* 2020; 174(9); 868-873.
15. Tagarro A, Epalza C, Santos M, Sanz-Santaeufemia FJ, Otheo E, Moraleda C, et al. screening and severity of corona virus disease 2019 (COVID - 19) in children in Madrid, Spain.
16. Edgar Bustos-Cordova¹, Daniela Castillo-Garcia², Magdalena Ceron-Rodriguez¹, Nadia Soler-Quinones¹ Clinical Spectrum of COVID-19 in a Mexican Pediatric Population 2021 Feb 15; 58(2): 126-128. doi: 10.1007/s13312-021-2126-5. Epub 2020 Dec 19
17. Manohar Lal Gupta, 1 Sunil Gothwal, 1 Raj Kumar Gupta, et al, Duration of Viral Clearance in Children With SARS-CoV-2 Infection in Rajasthan, India *IAP vol 58* Feb 2021.