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Original Research Article

CLINICAL, EPIDEMIOLOGICAL, LABORATORY PROFILE AND OUTCOME OF PAEDIATRIC AND NEONATAL COVID-19 POSITIVE CHILDREN TREATED AT A STATE COVID CENTRE-SOUTHERN INDIA

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ABSTRACT

BACKGROUND

The COVID-19 pandemic is a serious worldwide health emergency. Corona virus disease 2019 (COVID-19) caused by SARS-CoV-2 has spread around the world, and reports of children with COVID-19 are increasing. When compared to older adults, the clinical features, course of the disease, and prognosis seem substantially milder in youngsters.

METHODS

This retrospective observational study was undertaken using clinical data of sixteen (16) children (0-14 years) diagnosed and admitted with COVID-19 between April 1, 2020 to October 2020 at Designated State Covid Centre-VIMS (Visakha Institute of Medical Sciences)-Visakhapatnam in Southern India. The Protocol of this study was approved by the institutional ethical committee (Regd.No: INV/VIMS/Paediatrics/Oct/2020/001, Dt: 24/10/2020)**.**

RESULTS

A total of 2711 Patients of all age groups including Obstetric (Antenatal) cases admitted in our institute during the 1st wave of COVID-19 pandemic between April 2020 to October 2020.Out of them 16 patients (0.6%) (COVID-19 positive)belong to paediatric age group (0 to 14 years) .In our study we found 13 (81.25%)patients were Boys and 3(18.75%)Girls. The Male: Female ratio in our study was 4.3:1.Out of 16 patients of our study 15 (93.75%) had

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positive contact history with COVID -19 positive patients (Adult family members).Only One (6.25%) out of 16 patients had positive history of recent foreign travel. Out of 16 Children 87.5% (14) children survived and two children (12.5%) died, both were critically ill at admission and one had underlying co morbidity as CRF

CONCLUSIONS

Our study suggests that children predominantly contracted mild form of infection but could be at risk of more severe outcomes. It is crucial to take into consideration risk factors such as underlying co morbidities and young age which may increase the risk of severe disease. There is a need for much closer scrutiny/ follow up of this illness globally with individual patient data analysis.

KEYWORDS

COVID-19, Pandemic, Children

BACKGROUND

Corona virus disease-2019 (COVID-19) pandemic is a global health crisis. Since it was initially discovered in Wuhan, China in December 2019, COVID-19 has spread quickly to impact people worldwide. Children worldwide were responsible for 6.9% of SARS 2002–3 infections and 2% of Middle East Respiratory Syndrome (MERS) infections during prior Corona virus epidemics. SARS-CoV-2 seems to be more capable of spreading than the closely related viruses that cause MERS and SARS 2002-3.[1] youngsters make up between one and five percent of COVID-19 cases that are identified.[2] Nevertheless, many infected youngsters may not show any symptoms, making a diagnosis impossible without population screening. More than 90% of children who have tested positive for COVID-19 had asymptomatic, mild, or moderate infections; severe and critical cases make for 5.9% of cases, compared to 18.5% in adulthood.[3]

It is currently difficult to distinguish the clinical features of children with severe COVID-19 infection due to the lesser number of cases that have been described in children and the lack of a reliable biomarker to assess infection severity.[4] In the biggest paediatric assessment of 2143 children, Dong et al.[3] found that 13% of children with virological confirmation were asymptomatic. Because asymptomatic children are less likely to be screened and may nonetheless contribute to transmission, epidemiological inference becomes tricky. Furthermore, a considerable percentage of kids may also co-infect with other viruses; as a result, the finding of SARS-CoV-2 may not have a clinically relevant impact.[5] Though there are currently no long-term statistics to support this theory, the majority of infected children are probably secondary cases who get the virus after coming into contact with an adult who has tested positive for COVID-19. Transmission among families might be significant.[6]

On the basis of symptoms, laboratory abnormalities, chest imaging, and RT-PCR/genomic analysis, Dong et al.[3] presented suspected and verified cases. COVID-19 can infect children of all ages, but instances have been seen more frequently in younger children and newborns.[3] The median age of infection is 6.7 years (range: infant to 15 years), and there is no age or sex preponderance.[3,7] It has been observed that the incubation period of

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COVID-19 in children is 2 days, with a range of 2 to 10 days.[2] 13–15% of children who test positive for a virus may not show any symptoms at the time of diagnosis.[3,7] Fever (fifty percent) and a moderate cough (38 percent) are the most often reported first symptoms in children.[6] About 40% of children have a fever.[7] A sore throat, rhinorrhea, sneezing, myalgia, exhaustion, diarrhoea, and vomiting are some other clinical symptoms. Children seem to recover in 1-2 weeks[8] and may have more upper respiratory symptoms than lower respiratory symptoms.[3] COVID-19 was categorised as asymptomatic, mild, moderate, severe, and critical depending on severity. Moreover, children with just mild hypoxia were included in the classification of severe. Critical COVID-19 instances with virological confirmation that are characterised by organ failure or ARDS.

Compared to adults, children had comparatively lower rates of lymphopenia and higher levels of inflammatory markers, according to the few evidence.[2] After analysing data from 12 trials including 66 children, Henry et al.[9] observed normal lymphopenia (3.0%), neutropenia (6.0%), neutrophilia (4.6%), and leucocyte counts (69.2%). Procalcitonin and C-reactive protein (CRP) were elevated in only 10.6% and 13.6% of patients, respectively. Liver transaminase levels are frequently slightly elevated.[9] Children's chest X-ray results seem to be non-specific. Given the significant radiation exposure, children with minor diseases shouldn't usually require computed tomography (CT) chest imaging.[10] One-third of patients had ground glass opacities on CT scans.[7] It has been shown that lung lesions are distributed peripherally and include many lobar regions.[11] Paediatric patients are thought to typically exhibit consolidation with a surrounding halo sign.[12] However, because COVID-19 and other diseases have similar radiological appearances, chest CT alone is not a reliable way to detect the infection.

It is necessary to implement infection prevention control (IPC) measures right away if there is a suspicion of COVID-19 infection. The MOHFW's requirements must be observed when it comes to standard measures including hand hygiene, wearing personal protection equipment (PPE), managing waste safely, and cleaning and disinfecting equipment.[13] In its revised recommendations (effective as of April 7, 2020) for the first wave of COVID-19, the Ministry of Health and Family Welfare (MOHFW) [13] divided patients into three categories: those with mild, moderate, and severe disease, and they designated COVID-specific institutions for their treatment. As a confirmatory test for COVID-19, RT-PCR testing of nose and throat swabs for SARS-CoV-2 nucleic acid detection has been suggested.[14]

Supportive treatment, which includes proper nutrition and calorie intake, hydration and electrolyte management, and oxygen supplementation, is the cornerstone of care for the small percentage of children who may need to be admitted to a medical institution. An essential component of management is calming parents' fears and facilitating communication. It has been advised that people with severe COVID-19 should be placed prone, get early intubation, and use mechanical ventilation using lung protecting techniques.[8] If there is a suspicion of bacterial super-infection, antibiotics could be recommended. Remdesivir, a relatively novel antiviral medication being evaluated in adults with COVID-19, has been shown to decrease SARS-CoV-2 development in vitro when combined with chloroquine.[15] According to a Chinese article,[16] interferon alpha-2b and oral lopinavir/ritonavir together with corticosteroids for problems and intravenous immunoglobulin for severe patients have been advised. Nevertheless, it is not currently advised to use these medicines on children

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younger than 12 years old. Corticosteroids should not be used often since they may worsen lung damage linked to COVID-19.[17] The broad-spectrum anti-parasitic drug ivermectin exhibits antiviral activity against SARS-CoV-2 in vitro.[18]

The treatment of the extremely rare few children who arrive with life-threatening COVID-19, such as severe pneumonia, ARDS, sepsis, and septic shock, is not guided by results from randomised therapeutic trials. There is enough information on adult death predictors and the chronology of complications, but not enough on paediatric mortality predictors. It is still uncertain what the real case fatality rate (CFR) of COVID-19 infection is since there are insufficient population-scale longitudinal data. As a result, CFR estimates now range from 0.5 to 5%.[2,19]

Hence we conducted this study to find out the clinical ,epidemiological , laboratory profile and outcome of Covid -19 positive children with COVID-19 infection in this area by analysing the data of children (0-14 years) ,who were admitted in our designated State COVID centre during 1st wave.

Aims and Objectives

To study the clinical, epidemiological, laboratory profile and outcome of Covid -19 positive children with COVID-19 infection admitted to a designated State COVID centre in 1st wave.

METHODS

This retrospective observational study was undertaken using clinical data of sixteen (16) children (0-14 years) diagnosed and admitted with COVID-19 between April 1, 2020 to October 2020 at Designated State COVID Centre-VIMS (Visakha Institute of Medical Sciences) - Visakhapatnam in Southern India. The Protocol of this study was approved by the institutional ethical committee (Regd. No: INV/VIMS/Paediatrics/Oct/2020/001, Dt: 24/10/2020).Our Institute is a State COVID centre during 1st wave of COVID -19 and hence served for all Moderate and severe categories of COVID -19 cases (Adults, Children and Obstetric cases) referred from the surrounding 5 districts. For admission, treatment and discharge our institute followed the ICMR guidelines [20] and Andhra Pradesh State Covid-19 instant orders[21] issued time to time. The study included children who were hospitalised with COVID-19. Initially, all cases of COVID-19 were being hospitalised. The Government of India recommended home isolation for patients who were asymptomatic or mildly symptomatic without any co morbidity from July 2020 on- wards. After that, only moderate to severe cases, children with co morbidities and those for whom home isolation was not feasible were hospitalized. In addition, all children in hospitals underwent SARS-CoV-2 testing in accordance with institutional guidelines. A few kids underwent testing as part of the family screening process.

Inclusion Criteria

All admitted cases of Covid (RT-PCR) positive children (Severe category) between 0 to 14 years**.**

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Exclusion Criteria

Asymptomatic Cases, cases in home isolation, and cases with incomplete data were excluded. In this retrospective study, we retrieved children's data from birth to 15 years of age infected with SARS-CoV-2 and admitted in our institute from April 2020 to October 2020. Children who tested positive for SARS-CoV-2 by RT-PCR from upper or lower respiratory tract secretions were allowed to participate in the research. All hospitalised paediatric COVID-19 patients fulfilling the ICMR criteria with Covid-19 RTPCR positive were included. Data regarding epidemiological characteristics, Socio-economic status,[22] history of contact with COVID-19 positive patient, clinical history (included age, sex, pre- existing co morbid conditions etc) and clinical examination findings were retrieved from the hospital case sheets. According to recommendations from the Indian Council of Medical Research (ICMR), SARS-CoV-2 investigations were carried out. [20] and COVID instant orders issued by the State Government. In brief, the following were tested: Complete blood counts, C - reactive protein (CRP), Random blood sugar, Serum Creatinine, Serum Ferritin, D-Dimer, Chest-X Ray and COVID-19 (SARS-Cov2) -RTPCR. According to the clinical condition, investigations were conducted as determined by the treating team, including Serum electrolytes, Blood urea, CT-Chest and 2D-Echo etc.

For the treatment of COVID-19 in the paediatric age range, there were no particular national recommendations during the first wave of the virus, but there are some guidelines in the literature.[23] The majority of the time, supportive care was employed, with medication usage determined by each individual instance.

Statistical Analysis

All the above data is entered in Microsoft Excel spreadsheet and summarised. Demographic, clinical and laboratory parameters and outcome in children measured using descriptive statistics. Data were compiled and calculations were made using the SPSS 25.0 statistical package.

RESULTS

A total of 2711 Patients of all age groups including Obstetric (Antenatal) cases admitted in our institute during the 1st wave of COVID-19 pandemic from April 2020 to October 2020.Out of them 16 patients (0.6 %) (COVID-19 positive) belong to paediatric age group (0 to 14 years) (**Figure-1**) .The median age was 5.5 years in our study. In our study we found 13 (81.25%) patients were Boys and 3(18.75%) Girls (**Table-1**) .The Male: Female ratio in our study was 4.3:1.Out of 16 patients of our study 15 (93.75%) had positive contact history with COVID -19 positive patients (Adult family member) (Table-1). One infant of 4 months age in our study had no COVID positive family member, but he was admitted in neighbouring district teaching hospital for severe pneumonia and underwent treatment before he tested positive for COVID-19 RTPCR and then referred to our hospital. Only One (6.25%) out of 16 patients had positive history of recent foreign travel(Table-1).The predominant symptoms were fever 16 (100%), cough 14 (87.5%), cold 13(81.25%), throat/ throat pain 7(43.75%) , Headache 7(43.75%) , difficulty in breathing 6(37.6%) ,Chest pain 4 (25%), Vomiting 4(25%) and Loose motions 3(18.75%) of our patients(Table-1) .In our study population we found elevated body temperature (>100.4 F) in all (100%) patients. We found

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tachycardia and tachypnoea in 13(81.25%) and 6(37.5%) of patients respectively. Five patients (31.75%) in our study found to have hypoxia at admission (SPO2 <94% in room air) (Table-1). None of our patients had hypertension. Out of 16 COVID-19 positive children, 3 children found to have other co morbidities (1-Chronic Renal failure (CRF), 1-Right sided Empyema and Malnutrition with Severe Anaemia and 1-Oesophageal Foreign body (**Table-1; Figures: 3-12**). At admission among the 16 COVID-19 positive patients 6 (37.5%) had Pneumonia, 4 (25%) Upper Respiratory tract infection (URTI), 2(12.5%) Acute diarrhoeal disease (ADD), 1(6.25%) Pneumonia with ARDS (Acute Respiratory distress syndrome, 1(6.25%) Pneumonia with ARDS and CRF (Chronic Renal failure), 1(6.25%) Right pleural effusion / Empyema and 1(6.25%) URTI with Oesophageal foreign body as Clinical diagnosed cases (Table-1). Investigations done at admission have revealed Leucopoenia 8 (50%) , Leucocytosis 5(31.25%), reduced Haemoglobin- 3 (18.75%) ,Increased C-RP(C-Reactive Protein 10 (62.5%), Increased Serum Creatinine 1(6.25%) ,Increased Ferritin 3(18.75%) and Increased D-Dimer 3 (18.75%) of our patients (Table-1) .Out of 16 cases we treated 12(75%) patients with Conservative (supportive /Symptomatic) management. Two (12.5%) of our patients received Ventilator support and another two (12.5%) cases (Empyema & Oesophageal foreign body cases) required and managed with surgery by our institute Surgical, Anaesthesia and ENT team (**Table-1; Figures: 3-12**).Out of 16 paediatric cases 68.8% (11) were treated in COVID isolation wards and 32.25%(5) were treated in ICU (Intensive care unit) (**Figure-2).**The majority of symptomatic children received supportive therapy .The median duration of hospital stay was 14 days. Out of 16 Children 87.5% (14) children survived and two children (12.5%) died, both were critically ill at admission and one had underlying comorbidity as CRF (Table-1).

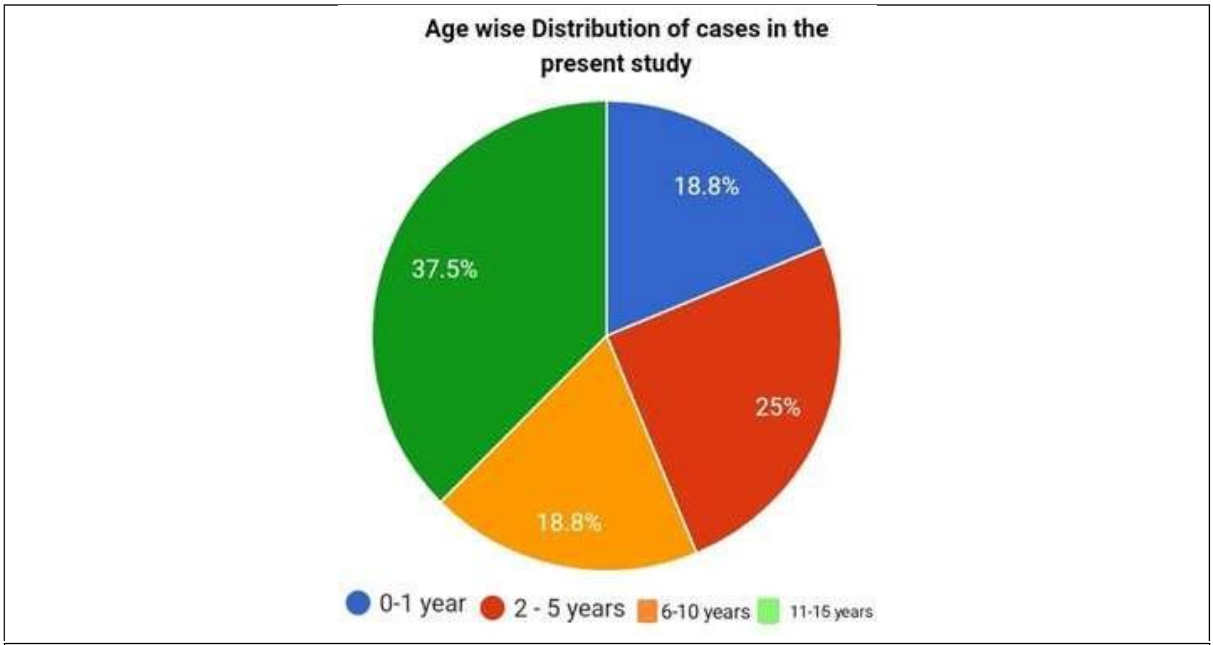

Figure 1: Pie Diagram Showing Age Wise Distribution of COVID-19 Cases in the Present Study

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Epidemiological, Clinical ,Laboratory Parameters .and Treatment Outcome Present Study		Frequency (Number)	Percentage (%) N=16
Gender	Boys	13	81.25
	Girls	3	18.75
	Total	16	100
Age Group	0-1 Year	3	18.75
	2-5 Years	4	25
	6-10 Years	3	18.75
	11-15 Years	6	37.5
	TOTAL	16	100
Positive Contact (COVID-19 patient) History		15	93.75
Positive History of Recent Foreign Travel		1	6.25
Socioeconomic Status	Class-1	1	6.25
	Class-II	2	12.5
	Class-III	9	56.25
	Class-IV	3	18.75
	Class-V	1	6.25
Clinical Symptoms	Fever	16	100
	Cold	13	81.25
	Cough	14	87.5
	Throat Pain	7	43.75
	Breathing Difficulty	6	37.5
	Head Ache	7	43.75
	Chest Pain	4	25
	Vomiting	4	25
	Loose Motions	3	18.75
Clinical Signs	Temperature (>100.4 F)	16	100
	Tachycardia	13	81.25
	Tachypnoea	6	37.5
	Hypotension	2	12.5
	Hypertension	0	0
	Hypoxia (<94% in Room Air)	5	31.25
Comorbidities	Chronic Kidney Disease	1	6.25
	Foreign Body Oesophagus	1	6.25
	Anaemia & Malnutrition	1	6.25
Diagnosis AT Admission (COVID-19 Positive &…)	Pneumonia	6	37.5
	Pneumonia+ARDS	1	6.25
	Pneumonia +CRF+ARDS	1	6.25
	Oesophageal Foreign Body	1	6.25
	Empyema Thoracis	1	6.25
	URTI	4	25
	Add	2	12.5

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	Total	16	100
Results of Investigations	Normal Haemoglobin	13	81.25
	Reduced Haemoglobin	3	18.75
	Normal T-WBC	3	18.75
	Leucopenia	8	50
	Leucocytosis	5	31.25
	Normal CRP	6	37.5
	Increased CRP	10	62.5
	Normal Ferritin	13	81.25
	Increased Ferritin	3	18.75
	Normal D-Dimer	13	81.25
	Increased D-Dimer	3	18.75
	Increased Serum Creatinine	1	6.25
	Normal Chest X-Ray	9	56.25
	Pneumonia in Chest -X-Ray	6	37.5
	Empyema Thoracis (Right side)-CT-Scan Chest.	1	6.25
Treatment	Conservative (Supportive/Symptomatic)	12	75
	Ventilator Support	2	12.5
	Surgical Support	2	12.5
Duration of Hospital Stay	</=10 Days	5	31.25
	10-14 Days	8	50
	>14 Days	3	18.75
Outcome	Discharged	14	87.5
	Death	2	12.5

Table 1: Distribution of demographic, clinical, laboratory parameters .and treatment outcome in the present study population

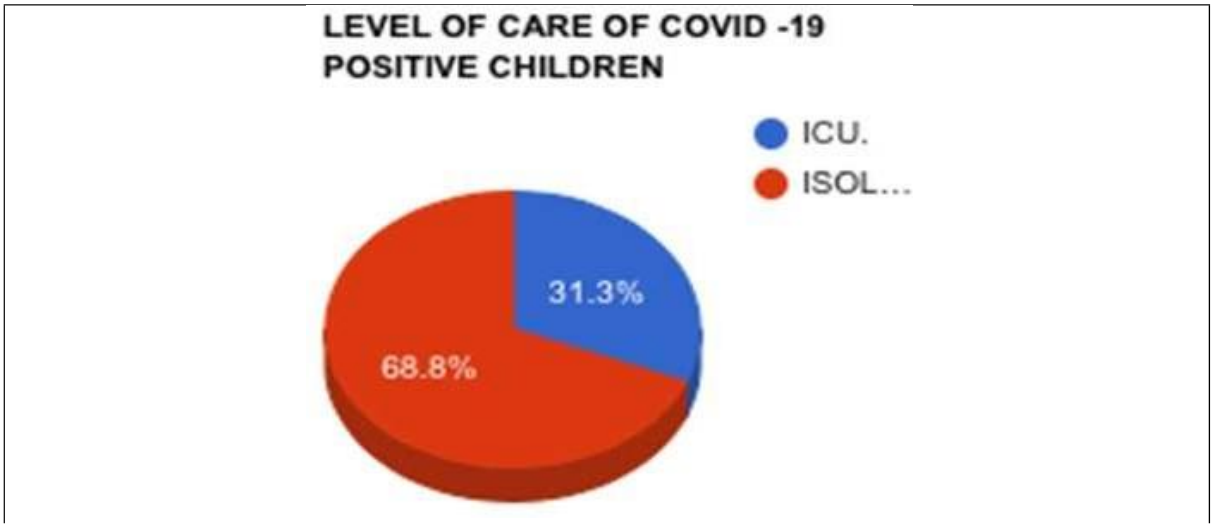

Figure-2: Pie Diagram Showing the Distribution of Level of Care Among the Present Study Population (n=16)

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	*Figure 3*
	*Figure 4*
	*Figure 5*

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	*Figure 6*
	*Figure 7*
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	*Figure 11*

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Figure 12

Figure 13

DISCUSSION

The clinical, epidemiological, and outcome characteristics of an early cohort of children (ages 0–14) admitted to a State COVID facility at a tertiary level hospital were given in our study. During the first wave of the pandemic, which lasted from April 2020 to October 2020 and was characterised by prolonged lockdowns, school closures, and outdoor activity restrictions, the main way that children became infected was through close home contacts. Among the children that had symptoms, we discovered that fever and respiratory issues were the most common. The subsequent typical symptom was stomach discomfort. Worldwide observational studies have indicated comparable symptom frequencies.[24-27] Fever was found in half of the trials (41%–58%), followed by cough (39%–51%) and fast breathing (6%–17%), according to a systematic evaluation of 27 research. In children, gastrointestinal symptoms, especially diarrhoea, were observed in 6%–13% of cases.[28] Depending on the cohort (community or hospital based) and hospital admission criteria, studies have revealed a broad variation in illness severity; nevertheless, overall, severe and critical COVID-19 was less prevalent, found in only 1-2% of children.[28-31]

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In our study we found 5(31.25%) out of 16 children had severe disease and critically ill at admission. All these 5 children had hypoxia (SPO2 <94% in Room air) and 2 of them required mechanical ventilation and remaining 4 had oxygen support with face mask. Out of these 5 children 2 (12.5%) died (one male and 1 female (3&5 years respectively).Both of them presented with severe Pneumonia + ARDS and the female child had CRF (Chronic Renal failure) as a co morbidity.

In a cross-sectional descriptive study conducted at the dedicated COVID-19 hospital of a Nine (29%) of the thirty-one children in the Karthi Nallasamy et al.[32] tertiary care referral facility in North India were newborns. 23 out of 74% have already interacted with a home. Six (19%) children were found to have co-morbidities. Over half (58%) did not exhibit any symptoms. Fever (32%) was the most prevalent symptom among the 13 children who had symptoms, followed by cough (19%), fast breathing (13%), diarrhoea (10%), and vomiting (10%). Only one kid (3%) had lymphopenia. Three (10%) of the children had elevated CRP. Among babies with co morbidities, severe (4, 13%) and critical (1, 3%) diseases were seen more frequently. One kid (10%) died and three (10%) needed invasive ventilation and PICU hospitalisation. The average duration of hospital stay was fifteen (11-20) days. A larger percentage than in previous reports-16% of the 31 children had a serious or critical illness—may have been caused by referral bias, underlying comorbidities, and the small sample size. They noticed that younger babies and kids with co-morbidities related to the heart or lungs typically had a more severe case of the sickness. Two of the three infants who needed mechanical breathing had underlying congenital heart disease (heart block and shunt lesion), and they had developed heart failure. One of them, a little baby, experienced acute respiratory distress syndrome before passing away from the condition.

Our study is nearly correlating with this study in terms frequency distribution of presenting symptoms, severe / critical cases, ICU treatment, Mechanical ventilation, duration of hospital stay, mortality and outcome .In the present study we had fever as most common symptom (16,1006 (37.5%) %) . We found male preponderance 13 (81.25%), Leucopoenia 8 (50%) , Leucocytosis 5(31.25%) , Increased CRP 10 (62.5%) ,Increased Serum creatinine in 1(6.25%) , increased Ferritin and D-Dimer in 3(18.75%) of our study population. These differences could be due to small sample size and the referral category of patients we got as ours is a State COVID centre.

Young children seem to be at increased risk of critical disease and mortality.[33] In a large Compared to 3%–4% for older children, a Chinese paediatric study found that the percentage of severe and critical cases was 10.6% and 7.3% for the <1 and 1–5 y age groups, respectively.[34] Children who have underlying co-morbidities are more likely to be admitted to critical care and suffer from severe illness.[35] Four out of five (80%) of the children with co-morbidities showed multiorgan involvement, according to a brief UK report.[36] Over 80% of the 48 infants with COVID-19 who were hospitalised to 14 PICUs in the US had serious underlying medical issues, according to a research.[37] We found a median age of 5.5 years, but a research by Banerjee S et al from West Bengal, India (n=41) found a median age of 1 year.[38]

They studied 41 patients (24 boys) with the median age of 1 (0.42-5.0) year, where as in our study the median age was 5.5 years. In the Banerjee S et al research, six (14.6%) neonates with COVID-19 were delivered to women who tested positive for the virus; the

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remaining five patients, with the exception of one, did not exhibit any symptoms at all while they were in isolation. We had 1 neonate (26 days old) with COVID-19, born to SARS-COV-2 positive mother and was symptomatic (Fever) in our study.

In Banerjee S et al study,[34] 14 (34%) were mildly symptomatic in the form of common cold and rhinorrhea. Fever, which is perceived to be a major presenting feature of COVID-19, was seen only in 9 patients (21%). where as in our study we found 16(100%) patients with fever as common symptom. Majority of the cases in Banerjee S et al study 40 (97.6%) were successfully discharged, with one death. we had similar findings in our study group with 14(87.5%) discharges and 2(12.5%) deaths.

Fever was recorded in 30–100% of children with SARS-CoV-2 infection, according to a few Chinese investigations.[26] About 50% of children experienced fever, according to studies from the USA and Europe.[27-29] Fever and cough were recorded in 59.1% and 55.9% of children, respectively, according to a systematic study.[30] In summary, fever and cough are the most prevalent signs of COVID-19 in children; however, other investigations have shown that these symptoms are only present in around half of the patients. Furthermore, variations in testing/admitting strategies/criteria and geographic variables may contribute to the variety of symptoms.

According to a comprehensive analysis, leucopoenia accounted for 16% (95% CI 11–22) of all laboratory abnormalities in children.[39] Leukocytosis (5,31.25%) was less common in our research than leucopoenia (8,50%).Raised CRP and PCT were seen in 16% (95% CI 10–22) and 25% (95% CI 9–42) of the youngsters in the same systematic review.[39] A significant percentage of the youngsters evaluated in our research had elevated CRP (Table 2). The fact that we included hospitalised youngsters in our study may help to explain the increased inflammatory markers.

The death rate in our research was greater (2, 12.5%). The fact that we only included children who were hospitalised might be the reason for the increased fatality rate.

Further ,ours is a State COVID centre and we admitted all referral cases from the surrounding five districts / tertiary care referral centres where we got mostly symptomatic(16,100%) and severe category cases(5,31.75%) . Lastly, 18.75 %(3/16) children had underlying co morbidity in our cohort and contributed high mortality.

Younger (less than one year old) was mentioned by Dong et al.[3] as a risk factor for serious illness. Similar to this study, Oualha et al.[40] and Shekerdemian et al.[37] discovered that an underlying medical condition was a risk factor for severe illness. Younger (less than 2 years) and older (15-18 years), male, Hispanic children, thrombocytopenia, and elevated CRP were all mentioned by Bhumbra et al.[41] as risk factors for severe illness. According to a recent review, the majority of studies included young age and pre-existing medical conditions as risk factors for severe disease in children; however, a smaller number of studies included adolescents and young adults, higher levels of pro-BNP (proB-type Natriuretic peptide), PCT, and CRP, lower platelet counts, increased ferritin, increased D-dimer, decreased lymphocyte count, cytokine storm, imaging abnormalities, and co-infection with RSV as risk factors for severe disease.[42]

This study's strength is that it includes one of the biggest samples of hospitalised children (0-14 years old) from this region who had COVID-19 during the pandemic's early (1st wave) phase. Second, we have included the epidemiological, clinical characteristics,

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laboratory investigations and treatment outcome in our cohort. The study had a few limitations also. The small number of cases included in the present study may not generalise the findings. Few reports of inflammatory indicators in the paediatric age range have been found. Additionally, the majority of individuals undergoing laboratory testing were unwell. Comparing this study to community-based studies or studies that enrol children who are both hospitalised and out-of-hospitalized may cause it to exaggerate the prevalence of observations.

CONCLUSIONS

All age groups of children are susceptible to COVID-19. The most frequent clinical symptom was fever. Most of the kids had either no symptoms at all or very little. The majority of children infected with COVID-19 during the early stages of the pandemic had a home contact and showed no symptoms at all. It was noted that young newborns, children, and those with co-morbidities had severe and critical sickness. The majority recovered well enough to be released from the hospital. Our research and a review of the literature indicate that severe COVID-19 illness in children is linked to underlying co morbidity and elevated inflammatory markers, which may also increase mortality.

REFERENCES:

[1] Pedersen SF, Ho Y. SARS-CoV-2/: A Storm is Raging. JCI. 2020 Mar 27. [Epub ahead of print].Available from: https://www.jci.org/articles/view/137647/pdf.

[2] Ludvigsson JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults. Acta Paediatr 2020. https://onlinelibrary.wiley.com/doi/epdf/10.1111/ apa.15270.

[3] Dong Y, Mo X, Hu Y, Qi X, Jiang F, Jiang Z, et al. Epidemiological characteristics of 2143 pediatric patients with 2019 coronavirus disease in China. Pediatrics 2020. Available from:https://pediatrics.aappublications.org/content/pediatrics/early/2020/03/16/peds.2020- 0702.1.full-text.pdf. Accessed on April 04, 2020. [Epub ahead of print].

[4] Sinha IP, Harwood R, Semple MG, Hawcutt DB, Thursfield R, Narayan O, et al. COVID-19 infection in children. Lancet Respir. 2020 Mar 27. Available from: https://www.thelancet.com/action/showPdf?pii=S2213- 2600%2820%2930152-1. Accessed on April 05, 2020. [Epub ahead of print].

[5] Cruz A, Zeichner S. COVID-19 in Children: Initial characterization of the paediatric disease. Paediatrics. 2020 Available from: https:// pediatrics.aappublications.org/content/pediatrics/early/ 2020/03/16/peds.2020-0834.1.full-text.pdf.

[6] Jiehao C, Jing X, Daojiong L, Lei X, Zhenghai Q, Yuehua Z, et al. A case series of children with 2019 novel coronavirus infection: clinical and epidemiological features. CID. 2020 Feb 28. [Epub ahead of print]. Available from: https://academic.oup.com/cid/advance- article-pdf/doi/10.1093/cid/ciaa198/32709823/ ciaa198.pdf. Accessed on April 06, 2020.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 1, 2023

[7] Lu X, Zhang L, Du H, Zhang J, Li YY, Qu J,et al. SARS- CoV-2 Infection in children. NEJM. 2020 Mar 18. Available from: https://www.nejm.org/doi/pdf/10.1056/ NEJMc2005073? articleTools=true. Accessed on April 05, 2020.

[8] Cao Q, Chen Y, Chen C, Chiu C. SARS-CoV-2 Infection in children: Transmission dynamics and clinical characteristics. J Formos Med Assoc 2020;119:670-673.

[9] Henry BM, Lippi G, Plebani M. Laboratory abnormalities in children with novel coronavirus disease 2019. CCLM. 2020 Mar 16. Available from: https://www.degruyter.com/ downloadpdf/journals/cclm/ahead-of-print/article- 10.1515-cclm-2020-0272/article-10.1515-cclm-2020- 0272.xml.

[10] Kelvin AA, Halperin S. COVID-19 in children: the link in the transmission chain. Lancet Infect Dis. 2020 Mar 25. Available from: https://www.thelancet.com/action/ showPdf?pii=S1473-3099%2820%2930236-X.

[11] Li B, Shen J, Li L, Yu C. Radiographic and Clinical Features of Children with 2019 Novel Coronavirus (COVID-19) Pneumonia. Indian Pediatr. 2020 Apr 07. Available from: https://www.indianpediatrics.net/ CONVID29.03.2020/RP-00156.pdf

[12] Xia W, Shao J, Guo Y, Peng X, Li Z, Hu D. Clinical and CT features in pediatric patients with COVID-19 infection: Different points from adults. Pediatric Pulmonology. 2020 Mar 5. Available from: https://onlinelibrary.wiley.com/doi/epdf/10.1002/ppul.24718.

[13] Ministry of Health and Family Welfare. Available from: https://www.mohfw.gov.in. Accessed on April 08,2020.

[14] Revised Guidelines on Clinical Management of COVID - 19 [Internet]. Ministry of Health and Family Welfare. Available from: https://www.mohfw.gov.in/pdf/ Revised National Clinical Management Guideline for COVID1931032020.pdf.

[15] Wang M, Cao R, Zhang L, Yang X, Liu J, Xu M, et al. Remdesivir and chloroquine effectively inhibit the recently emerged novel coronavirus (2019-nCoV) in vitro. Cell Res 2020;30:269-71.

[16] Qiu H, Wu J, Hong L, Luo Y, Song Q, Chen D. Clinical and epidemiological features of 36 children with coronavirus disease 2019 (COVID-19) in Zhejiang, China: an observational cohort study. Lancet Infect Dis. 2020 Mar 25. Available from: https://www.thelancet.com/action/ showPdf?pii=S1473-3099%2820%2930198-5.

[17] Russel CD, Millar JE, Baillie JK. Clinical evidence does not support corticosteroid treatment for 2019-nCoV lung injury. Lancet 2020;395:473-5.

[18] Caly L, Druce JD, Catton MG, Jans DA, Wagstaff KM. The FDA-approved Drug Ivermectin inhibits the replication of SARS-CoV-2 invitro. Antiviral Res. 2020 Apr 03. Available from: https://www.sciencedirect.com/science/article/pii/ S0166354220302011/pdfft?md5=bd2a8d1cfbe3680f2d40 5b4a62642a15&pid=1-s2.0-S0166354220302011-main. pdf.

[19] Spychalski P, Blazynska-Spychalska A, Kobiela J. Estimating case fatality rates of COVID-19.Lancet Infect Dis. 2020 Mar 31. [Epub ahead of print]Available from: https://www.thelancet.com/pdfs/journals/laninf/PIIS1473- 3099(20)30246-2.pdf.

[20] Indian Council of Medical Research, New Delhi. https:// www.icmr.gov.in/ (8 January 2021, date last accessed).

[21] https://hmfw.ap.gov.in/covid_19_instantc_orders.aspx.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 1, 2023

[22] Pandey VK, Aggarwal P, Kakkar R. Modified BG Prasad Socio-economic Classification, Update – 2019.Indian J Comm Health. 2019;31(1):123-5.

[23] Liu E, Smyth RL, Luo Z, et al. Rapid advice guidelines for management of children with COVID-19. Ann Transl Med 2020;8:617.

[24] Stanley F. Reference intervals for laboratory tests and proce- dures. In: Kliegman RM, Geme JW, Blum NJ et al. (eds.) Nelson Textbook of Pediatrics, 21st edn. Elsevier Philadelphia 2019:2466 e6-12.

[25] Wang Z, Zhou Q, Wang C, et al.; COVID-19 Evidence and Recommendations Working Group. Clinical charac- teristics of children with COVID-19: a rapid review and meta-analysis. Ann Transl Med 2020;8:620.

[26] 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.

[27] Stokes EK. Coronavirus disease 2019 case surveillance - United States, January 22–May 30, 2020. MMWR Morb Clinical Profile of COVID-19 in Children 11 Mortal Wkly Rep 2020;69. https://www.cdc.gov/mmwr/volumes/69/wr/mm6924e2.htm (29 December 2020, date last accessed).

[28] Parri N, Lenge M, Buonsenso D; Coronavirus Infection in Pediatric Emergency Departments (CONFIDENCE) Research Group. Children with COVID-19 in pediatric emergency departments in Italy. N Engl J Med 2020;383:187-90.

[29] Go ¨tzinger F, Santiago-Garc ´ıa B, Noguera-Julia ´n A, et al. COVID-19 in children and adolescents in Europe: a multi- national, multicentre cohort study. Lancet Child Adolesc Health 2020;4:653-61.

[30] Hoang A, Chorath K, Moreira A, et al. COVID-19 in 7780 pediatric patients: a systematic review. EClinicalMed 2020;24:100433.

[31] Zhang L, Peres TG, Silva MVF, et al. What we know so far about Coronavirus Disease 2019 in children: a meta-ana- lysis of 551 laboratory-confirmed cases. Pediatr Pulmonol 2020;55:2115-27.

[32] Nallasamy K, Angurana SK, Jayashree M.Clinical Profile, Hospital Course and Outcome of Children with COVID-19 .The Indian Journal of Pediatrics 2021;88(10):979-84.

[33] Sarangi B, Reddy VS, Oswal JS, et al. Epidemiological and clinical characteristics of COVID-19 in Indian children in the initial phase of the pandemic. Indian Pediatr 2020;57:914-7.

[34] Xia W, Guo Y, Tian Z, et al. Clinical features and temporal changes of RT-PCR and chest CT in COVID-19 pediatric patients. Front Pediatr 2020;8. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7581798/

[35] Dong Y, Mo X, Hu Y, et al. Epidemiological characteristics of 2143 pediatric patients with 2019 cor- onavirus disease in China. Pediatrics 2020. https:// pediatrics.aappublications.org/content/early/2020/ 03/16/peds.2020-0702

[36] Kelvin AA, Halperin S. COVID-19 in children: the link in the transmission chain. Lancet Infect Dis 2020;20:633-4.

[37] Shekerdemian LS, Mahmood NR, Wolfe KK, et al.; International COVID-19 PICU Collaborative. Characteristics and outcomes of children with coronavirus disease 2019

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 1, 2023

(COVID-19) infection admitted to US and Canadian Pediatric Intensive Care Units. JAMA Pediatr 2020;174:868-73.

[38] Banerjee S, Guha A, Das A, et al. A preliminary report of COVID-19 in children in India. Indian Pediatr 2020;57:963-4.

[39] Meena J, Yadav J, Saini L, et al. Clinical features and out-come of SARS-CoV-2 infection in children: a systematic review and meta-analysis. Indian Pediatr 2020;57:820-6.

[40] Oualha M, Bendavid M, Berteloot L, et al. Severe and fatal forms of COVID-19 in children. Arch Pediatr 2020;27:235-8.

[41] Bhumbra S, Malin S, Kirkpatrick L, et al. Clinical features of critical coronavirus disease 2019 in children. Pediatr Crit Care Med 2020;21:e948-53.

[42] Tsabouri S, Makis A, Kosmeri C, et al. Risk factors for severity in children with coronavirus disease 2019. Pediatr Clin North Am 2021;68:321-38.