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Clinical and Epidemiological Profile of Sars Cov- 2infection in Paediatric Population-A Retrospective Study

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ABSTRACT:Back ground:December 2019 outbreak ofcoronavirus disease (COVID -19) has spread globally .Little is known about clinical and epidemiological features in paediatric patients with COVID -19. Literature on
disease characteristics among children from India is sparse. With unlockingincidence of infection increasing.
Objectives:Toevaluate theclinical and epidemiological profile of COVID-19 in paediatric population
Study design:A retrospective analysis of clinical data of60 admitted children (aged 1month-18years) diagnosed with COVID-19from Juneto October 2020 at Cheluvamba Hospital a tertiary care centre attachedtoMysore Medical College And Research Institute Mysore,Karnataka.
Results: 60 children aged 1month to 18years were included in the study. 70% of paediatric patients were infected throughfamily members with COVID-19.The median incubation period was 7 days.A majority of COVID-19patients show mild to moderatedisease (81%) , few develop severe disease(10%) and 8.3% patientswere asymptomatic.The predominant clinical features amongthecases studied wasfever (92%) and cough (81%). Laboratory evidence showed normal leukocyte count in51.6%,leucopenia in 41% and lymphopenia in40%.Radiological abnormality was seen in 49% patients. The overall prognosis of paediatric COVID-19 wasgood with mortality of 10%.
Conclusion: Although in our studypaediatric patients with covid-19 had mildto moderate disease asymptomatic cases indicates the difficulty in identifying paediatric patients without clear epidemiological information.This suggests a dangerous situation if community acquired infection occur.This study will help to recognize paediatric covid-19 and to guide development of preventive measures.
Key words:COVID -19,RTPCR,SARS CoV-2

I. INTRODUCTION:

The 2019 outbreak of corona virus infection in Wuhanhas beenattributed to severe acute respiratory syndrome corona virus -2[1].Termed corona virus disease 2019(COVID-19) by World Health Organization(WHO),it has spawned a public health emergencyof International Concern[2]. Corona virus infectionis an infectious disease caused by newly discovered corona virus, spreads primarily through droplets of saliva ordischarges from nose when aninfected person coughor sneezes[2].Corona virus hasspherical to pleomorphic enveloped particle with a single sensepositive stranded RNA[3].Till now 46.4million peoples were infectedworld wide and 1.198 milliondeath occured.8.2millioncases reported from Indiawith 1.2lakh death[4].This article gives aninformation about clinical features and epidemiological profile in paediatric COVIDpatients.

II. METHOD:

Study Population: children aged 1month to 18 years
Study design:
Weretrospectively reviewed clinical data of60 children (1month-18years)who were laboratory confirmed (RT PCR for corona virus positive)COVID-19 andmanaged in our hospital from Juneto October 2020.Ethicalcommittee approval was obtained. All subjects met the diagnostic criteria established in India stipulated by ICMR and Ministry Of Health And Family Welfare, Government OfIndia[5]. Accordingly cases were defined has follows:

Suspected case:

A. Patient with acute respiratory illness(fever and atleast one sign /symptomof respiratory disease likecough,shortness of breath) and history of travel to or residence in a location reporting community transmission of COVID-19 disease during 14days prior to onset of symptom

OR

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B. Patient with any acute respiratory illness and havingcontact with a confirmed or probable COVID19case in 14days prior toonset ofsymptom

OR

C. Patient with severe acute respiratory illness (fever and atleast one sign/symptom of respiratory disease like cough ,shortness of breath and requiring hospitalization) and in absence of an alternative diagnosis that fully explainthe clinical presentation[5]

PROBABLE CASE:

A.A suspect case for whom testing for COVID-19 is inconclusive

OR

B.A suspect case for whom testing could not be performed for any reason[5]

CONFIRMED CASE:

A person with laboratory confirmation of COVID-19(RT PCR positive for COVID-19)infection irrespective of clinical signs and symptoms[5].

we screened all patients who had symptoms of COVID-19as per WHO surveillance guidelines[6] Usually patient present with fever,cough,fatigue,shortness of breath,myalgia,rhinorrhea,sorethroat and diarrhea. Weconfirmed SARS-CoV-2 infectionby RT-PCR test. Epidemiologicalinvestigation was focused on route of transmissionof infectionby assessingtravel history,residence in epidemic area andclose contact with patients Who were confirmed to haveCOVID-19 infection within 14days, also collected data regarding clinicalsymptoms, laboratory parameters ,radiographic imaging(chest xray) , management and outcome.

III. RESULTS:

Epidemiological characteristics of paediatric COVID-19

Epidemiological details of 60 confirmed COVID -19 paediatric patients were evaluated. Children aged 1month to 18 years were included inthestudy with median age of 8years. Male to Female gender ratio of 2:1 was found with 76% of patients from urban area and 24% from rural area (TABLE 1)

Table 1 Epidemiological characteristics of paediatric COVID-19

Number Of Patients Studied	**60**
Median age	8 YEARS
Male : Female Ratio	2:1
Family members with COVID-19	42(70%)
Non family member with COVID-19	8(13%)
History of exposure to epidemic area	5(8.3%)
Indefinite history of exposure	5(8.3%)
Urban :Rural Area	(3.1:1)

As shown inTable 1,family clustering wasthemajor route oftransmission of corona virus infectionin paediatric patients. There were 42 (70%) patients infected by close contact with family members,8(13%) were infected by close contact with non family members, 5(8.3%) had history of exposure in epidemic areaincluding residence in and around,5(8.3%%) had undefined history of exposure since they had not taken any travel to epidemic area or had no contacts with definitely diagnosed cases or with individuals having travel history to epidemic area. Most of the patients had median incubation period of 7 days ranging from 0 to 14 days

Clinical characteristics of paediatric COVID-19

In our study 35(58%) children had milddisease ,14(23%) had moderate disease,and 8(13.3%) had severe disease.The disease severity was categorized according to guidelines given By Ministry Of Healthand
Family Welfare Government Of India[5].

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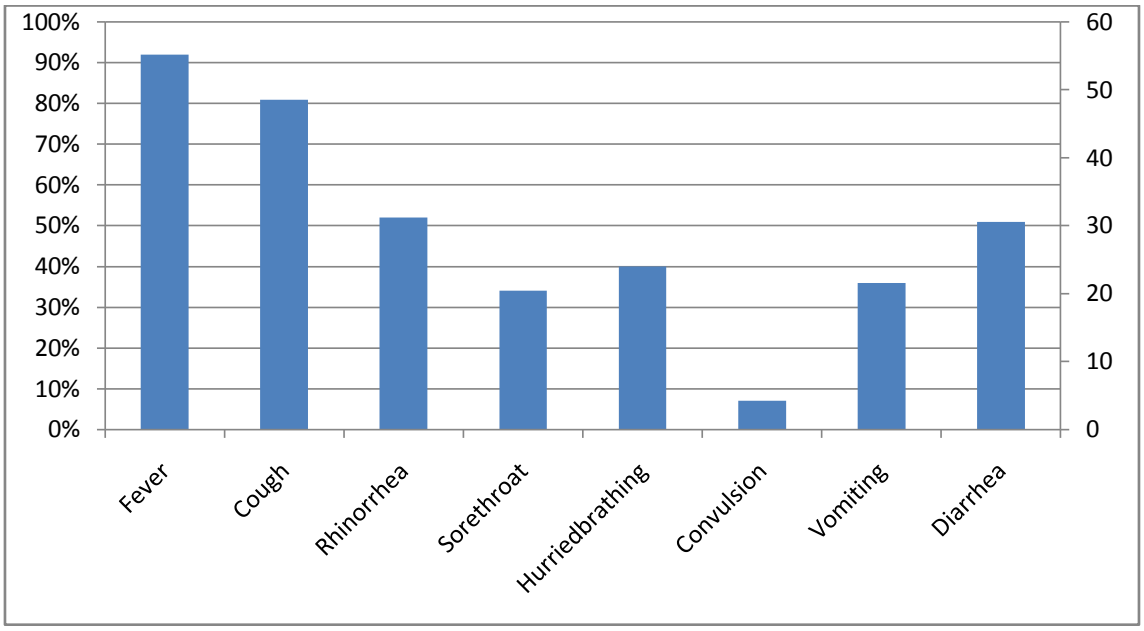
Clinical severity	Clinical presentation	Clinical parameters	LABORATORY AND RADIOLOGICAL FINDINGS
Mild	Symptoms of upper respiratory tract infection such as fever ,cough,cold,malaise and headache	No evidence of breathlessness or hypoxia	No radiological abnormality ,no laboratory evidence of organ damage or coagulation failure
Moderate	Pneumonia with no sign of severe disease	Child with presence of hypoxia or breathlessness ,tachypnea with saturation less than 94% at room air	Radiological finding suggesting feature of pneumonia and no laboratory evidence of organ damage or coagulation failure
Severe	Severe pneumonia with sepsis ,shock,ARDS	Child with grunting ,chest indrawing,central cyanosis,danger sign like lethargy,convulsion	Radilogical feature of ARDS and laboratory evidence of organ damage and coagulation failure

Clinical characteristics of paediatric COVID -19

Table 2

Clinical symptoms	Characteristics
Fever	52(92%)
Cough	45(81%)
Rhinorrhea	29(52.7%)
Sore throat	19(34%)
Hurried breathing	22(40%)
Convulsion	4(7%)
Vomiting	20(36%)
Diarrhea	28(51%)

FIGURE -1



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Out of 60 children 5 were asymptomatic, remaining55 children show symptomswhichinclude fever (92%) with body temperature ranging from37.6 to 40 degree Celsius,cough (81%) ,Rhinorrhea(52.7%),sore throat(34%), hurried breathing(40%),convulsion(7%),vomiting(36%) and diarrhea(51%) –Figure 1

Laboratory and radiological findings:
Haemo to logical examination to detect immunological response andcardiac ,liver and renal dysfunction done on the day or the next day of admission based on the protocol quoted in second edition IAP bulletin COVID-19[7].
25(41.6%)children had leucopenia,24(40%) had lymphopenia 31(51.6%) had normal leukocyte count. Elevatedhepatic enzymes was found in 25% ,high C-RP in 44% and evidence of coagulation failure seen
in 7%of children.

Table-3

Laboratory test	Number (%)
Leucopenia	25(41.6%)
Lymphopenia	24(40%)
Elevated AST	15(25%)
Elevated ALT	15(25%)
Elevated CRP	26(44%)
Deranged coagulation profile (PT/APTT/INR)	4(7%)

Chest radiograph was done in 55 childrenwho were symptomatic.It was found to be normal in 28(50.9%),24(43%) had patchy opacity,while 3(5.4%)had ground glass opacity.

TREATMENT AND OUTCOME:
Management consists of supportive care,nutritional support,hydration and antipyretics.Treatment protocol Followed according to guidelines given in secondedition IAP bulletin COVID-19[7].Oxygen supplementation was given to26(43.3%) children. 8(13.3%) children need invasive ventilation support. Azithromycin 10mg/kg/day given once aday for 5 days ,oseltamivir twice a day for 5 days Zinc 2mg/kg/day and vitamin c was given. In our study mean duration of fever was 3 days,improvement in Pneumonia was seen 5to 10 days after treatmentinitiation. SARS-CoV-2 RT PCR results become Negative after mean duration of 7 daystreatmentregardless of various initial manifestations.The mean Duration hospital stay was 14 days, 90% of patients got cured and discharged. 10%patients succumbed to death, of which 1 hadcoexisting B Cell Acute Lymphoblastic Leukamia, 4 had multisystem inflammatory syndrome developing acute respiratory distress syndrome and coagulation failure.

IV. DISCUSSION:

The current rapid global spread of SARS-CoV-2 infection prioritizes to identify effective preventive strategies andto develop optimal medical management. Inthis text we performed a retrospective review of COVID -19 children aged 1month to 18years to assess clinical and epidemiological features.This systemic reviewshows that childrenwith COVID-19 mainly infected through family clustering andacquired corona virus infection by close contact with family members who were confirmedto be infected with SARS-CoV-2(70%) or history of exposure to epidemic area or both.However in 6.6% children the source of infection remain unknown since they never visited to epidemic area, contact anyone from epidemic zone or been around anyone with definitive diagnosis COVID-19 .This may add a new layer of complexity for transmission of COVID-19 in children and may highlight importance of minimizing close contact with strangers. Two recent study done in All India Instiitute Of Medical sciences New Delhi [8] and study done in Zhejiang, China[9] shows that major route of transmission of infection was by close contact with family members who were covid 19 positive and exposure to epidemic area.

The commonestclinical features are fever,cough andgastrointestinal manifestation (diarrhea ,vomiting) . Sometimes gastrointestinal manifestation may be sole manifestation of

COVID-19.Overall respiratory Symptoms followed by gastrointestinal symptoms are the predominant manifestations.These findings play an important role in devising a screening strategy for COVID-19 in children. Study done in All India Instituite Of Medical sciences New Delhi [8] and study done in Zhejiang, China[9] shows that most common clinical manifestation was fever and cough.

In our study mostof the patients had mild to moderate disease with 10% children developed severe disease, Whereas study of clinical features and outcome of SARS CoV-2 done in All India Institute Of Medical Sciences New Delhi[8] show most Of patient develop mild to moderate disease with 4% developed severe disease.Most common laboratory findings in our study was leucopenia and lymphopeniasimilar to laboratory evidence with study done in All India Institute O f Medical Sceinces New Delhi[8] and Zhejiang,China [9]. In conclusion ,our study shows that paediatric patients with COVID -19 have a simple transmission modeeither by close contact with family members or by exposure to epidemic area, having mild to moderate disease.This study will help to recognize paediatric COVID-19 and guide development of preventive measure.

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