

Original Research Article

Retrospective analysis of disease profile and percentage of COVID positivity among patients presenting to paediatric triage of a tertiary care hospital during COVID pandemic lockdown period

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ABSTRACT

Background: Currently, limited reports analyze pediatric patients infected with SARS-Covid-19. We conducted this study with the purpose of assessing the disease profile and percentage of COVID positivity among pediatric patients presenting to our triage area.

Methods: A retrospective quantitative observational study was conducted in the pediatric triage area, department of pediatrics, Civil hospital campus, Ahmedabad, India. Patients aged 0-12 years were included with the study period from 1st April to 30th June, 2020. Patients fulfilling the ICMR testing criteria were considered as suspected COVID patients and tested for COVID. Remaining patients were triaged and managed either on OPD basis or admitted in PICU, NICU or pediatric ward. Also, data of OPD attendance rate and immunization rates of 3 months (April, May and June) of 2019 and 2020 were collected from pediatric OPD and vaccination center.

Results: A total of 709 patients presented in the triage out of which 35.5% were neonates, 28.6% were between 1-12 month, 23.2% were between 1-5 years and 12.6% were between 5-12 years. 12 out of 97 suspected patients tested positive for COVID 19. Among COVID positive patients, 50% had uncomplicated illness or mild pneumonia, while 50% had critical illness and were admitted in COVID ICU. Mortality among non COVID patients was 22.7%, and among COVID patients was 16.6%. A sharp fall was noted in the OPD attendance (10 times) and immunization rates (3 times) this year compared to last year.

Conclusions: Incidence of COVID positivity was comparable to the studies done in other countries. Even during the pandemic peak, the major chunk of pediatric admissions still belonged to the non COVID conditions. The drastic fall in immunization rates can have implications in the form of re-emergence of vaccine preventable diseases in the coming times.

Keywords: COVID-19, Paediatric, Tertiary care centre, OPD attendance, Immunization

INTRODUCTION

COVID-19 is illness caused by a novel coronavirus now called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was first identified during an outbreak of respiratory disease cases in Wuhan City, Hubei Province, China.¹ It was first reported to the WHO on December 31, 2019. On January 30, 2020, the WHO declared the COVID-19 outbreak a global health

emergency-and on March 11, 2020, the WHO declared COVID-19 a global pandemic.²⁻⁴

Illness caused by SARS-CoV-2 was termed COVID-19 by the WHO. The name was chosen to avoid stigmatizing the virus's origins in terms of populations, geography, or animal associations. On February 11, 2020, the coronavirus study group of the International Committee on Taxonomy of Viruses issued a statement announcing an

official designation for the novel virus: severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).⁵

Till date, there are 11,39,89,973 coronavirus cases in the world, with overall 25,31,542 (2.2%) deaths worldwide.¹⁸ India have 1,11,24,527 coronavirus cases with 1,57,248(1.4%) deaths. In Gujarat, there are 2,67,885 cases with 4410 deaths (1.6%).¹⁹

Data from all over the world reveals that most children with COVID-19 exhibit only mild symptoms, and treatment consists of supportive care only. Presentations of COVID-19 have ranged from asymptomatic/mild symptoms to severe illness and mortality. Symptoms may develop 2 days to 2 weeks following exposure to the virus.⁷ Limited data describe clinical manifestations of COVID-19 that are generally milder in children compared with adults, but also show that some children do require hospitalization and intensive care.⁸⁻¹² The most common serious manifestation of COVID-19 in pediatric patients appears to be pneumonia.

In India, a nationwide lockdown was imposed on 24th march 2020 to prevent spread of COVID-19 pandemic. Curbs were imposed on the movements of the people and most of the private paediatric clinics were closed, thus health services and routine immunization activities were affected. However, civil hospital, being a public sector hospital continued to receive both COVID and non-COVID patients.

In India, as in the rest of the world, the percentage of COVID infected children are much less as compared to adults (among pediatric population, in China, 2.2% of confirmed cases of COVID-19 were among children aged less than 18 years, while in Italy it was 1.2%, in US it was 2% and in Spain it was 0.8%).^{1-4,6}

While the data are available for adult patients with COVID-19, limited reports analyze pediatric patients infected with SARS-COVID-19.

We conducted this study with the purpose of assessing the disease profile and percentage of COVID positivity among pediatric patients presenting to our triage area.

The aim and objective of this study was to study the disease profile of pediatric patients presenting in triage during COVID-19 pandemic lockdown period; to study the incidence of COVID positivity among suspected COVID patients; to study the impact of COVID pandemic lockdown on total number of patients presenting to pediatric triage; to study the impact of COVID pandemic on pediatric OPD attendance rates and immunization rates.

METHODS

This study was conducted in the pediatric triage area, department of pediatrics, civil hospital campus,

Ahmedabad. The study design was retrospective quantitative observational study.

A prior permission from the head of department of pediatrics and medical superintendent was taken to access the medical records of the patients included in this study.

Patients in the age group of 0-12 years, presenting to the pediatric triage area in the study period from 1st April 2020 to 30th June, 2020 were included in this study.

Those patients who fulfilled the testing criteria as per ICMR recommendations were considered as suspected COVID-19 patients. These suspected COVID-19 patients were admitted in 1200 bedded COVID hospital in our campus and tested for COVID-19.

Those patients were suspected who fulfilled the testing guidelines as per ICMR recommendations given as follows: (a) all symptomatic individuals who have undertaken international travel in the last 14 days or; (b) all symptomatic contacts of laboratory confirmed cases (symptomatic refers to fever/cough/shortness of breath) or; (c) all hospitalized patients with severe acute respiratory illness (SARI) (fever AND cough and/or shortness of breath) or; (d) asymptomatic direct and high risk contacts of a confirmed case (should be tested once between day 5 and day 14 after contact). Direct and high-risk contacts include those who live in the same household with a confirmed case.²⁰

At the COVID-19 hospital, nasopharyngeal and oropharyngeal swab for COVID-19 was collected in viral transport media (VTM), transported on ice and tested for COVID-19 using real time RT PCR. In those patients in whom the covid report was indeterminate, a repeat sample was sent.

Those patients who were found to be COVID-19 positive were treated as per guidelines given by MOHFW and Government of Gujarat.

Patients who didn't fulfilled the ICMR testing guidelines were triaged, evaluated and managed either on OPD basis or admitted in PICU, NICU or pediatric ward in civil hospital, Ahmedabad.

Detailed history of all the patients was taken, patients were examined meticulously, and investigations were done as required. A presumptive diagnosis was made and treatment was started as per standard treatment guidelines.

Details of each patient included in this study was recorded in a case recording form. The data was then analyzed using appropriate statistical methods and microsoft excel was used as statistical software for calculations.

Data of OPD attendance rate and immunization rates of 3 months (April, May and June) of last year (2019) and current year (2020) were collected from pediatric OPD and

vaccination center of civil hospital, compared and analyzed.

RESULTS

A total of 709 patients presented in the triage area during the study period. A total of 3586 patients presented last year in 2019 from April to June. There was a fall of around 5 times in the number of patients presenting to triage in the current year compared to the last year.

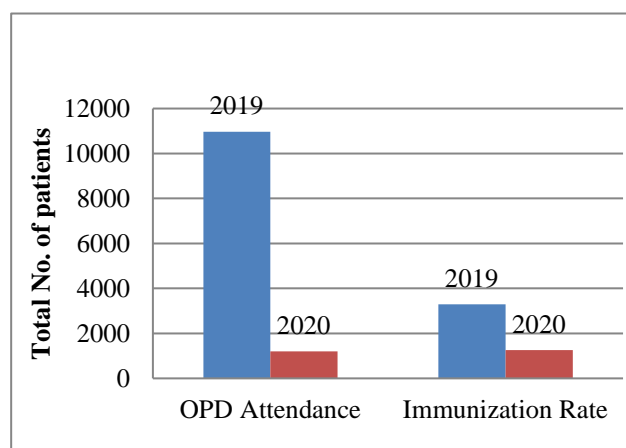


Figure 1: OPD attendance rates and immunization rates in 2019 and 2020 in the month of April to June.

415 were males and 294 were females with a male:female ratio of 1.4:1. Comparison of sex distribution of 2 years is given in Table 1.

Out of the total 709 patients that presented at triage, 252 (35.5%) were neonates <1month, 203 (28.6%) were between 1 month to 12month, 165 (23.2%) were between 1 year to 5 years and 89 (12.6%) were between 5 years to 12 years, which is also described in Table 2.

Table 1: Sex distribution of patients presenting to triage.

Year	Total patients	Male	Female
2019	3586	1952	1634
2020	709	415	294

Table 2: Age wise distribution of patients presenting to triage.

Age	No. of patients
Neonate (<1 month)	252 (35.5%)
Infant (1-12 month)	203 (28.6%)
1-5 years	165 (23.2%)
5-12 years	89 (12.6%)
Total	709

120 (16.9%) patients were admitted in PICU, 223 (31.4%) neonates were admitted in NICU and 130 (18.3%) were admitted in ward. 132 (18.6%) patients were treated on

OPD basis, while 7 (0.9%) patients gave negative consent for admission. 97 (13.7%) patients were COVID suspected patients and admitted in COVID designated 1200 bedded hospital, where they were tested for COVID 19. 12 out of 97 suspected patients tested positive for COVID 19, as given in Table 3-4.

Out of the 97 suspected patients, 20(20.6%) were neonates and 77 (79.3%) were pediatric patients out of which 2 neonates and 10 pediatric patients came COVID positive.

A total 697 (98.3%) patients, who didn't qualify for testing or in whom the COVID-19 testing was negative were considered as non-COVID cases.

Among the 697 non-COVID patients presenting in triage, 558 (78.7%) patients were admitted in the non-COVID hospital. Out of the total 558 non-COVID admitted patients, 223 (39.9%) were neonates and admitted in NICU, while 335 (60.1%) were pediatric patients of age more than 1 month and admitted in PICU and ward. Disease profile of non-COVID pediatric patients is described in Table 5.

Table 3: COVID suspected patients among patients presenting to triage.

Patient	Total patient presented in triage	COVID suspected	Percentage
Neonate	252	20	7.9
Pediatric	457	77	16.8
Total	709	97	13.6

Table 4: COVID positivity among suspected patients.

Patient	COVID suspected	COVID positive (% out of the total suspected patients)
Neonate	20	2 (10)
Pediatric	77	10 (12.9)
Total	97	12 (12.3)

A total 62 pneumonia cases where initially suspected as COVID and swab for COVID was sent in these cases, but they tested negative and were shifted to non-COVID Civil hospital.

Mortality among non-COVID patients was 10.7% (36 patients) among pediatric (>1month) patients and 40.3% (90 neonates) among neonates <1month with overall combined mortality of 22.3% among non-COVID admitted patients.

12 (1.69% of the total patients presenting in triage) out of 97 suspected patients tested positive for COVID-19 and they received treatment in COVID hospital as per ICMR and MOHFW guidelines. Out of the total 12 COVID positive patients, 3 patients had history of close contact.

Other 2 patients with history of close contact were COVID negative. Among the COVID positive patients, 2 patients were from red zone, 7 patients were from orange zone and 3 patients were from green zone. All the COVID positive patients were from Ahmedabad. 7 were male and 5 were female with male:female ratio of 1.4:1 among the COVID positive patients. Out of the total 12 COVID positive patient, 2 were neonates, 7 patients were infants between age 1 month to 1 year and 2 patients were between 1 year to 5 years and 1 patient was between 5 years and 12 years. Presentation of COVID positive patients was: -7 patients presented as SARI, 1 had acute gastroenteritis, 1 had pyrexia with convulsion and 2 patients presented with only pyrexia. 1 patient was asymptomatic (neonate with COVID positive mother). Disease profile of these patients is described in Table 6.

Table 5: Disease profile of non-COVID pediatric patients is as follows.

Sr. No.	Diagnosis	No. of patients
1	Pneumonia (COVID negative)	62 (18.5%)
2	Seizure disorder	59 (17.6%)
3	Acute gastroenteritis	65 (19.4%)
4	Acute febrile encephalopathy	18 (5.4%)
5	Septicemia	16 (4.8%)
6	Liver disease	17 (5.1%)
7	Nephrotic syndrome	8 (2.4%)
8	Congestive cardiac failure in a) severe anemia b) k/c/o CHD	8 (2.4%) 6 2
9	Surgical cases	18 (5.4%)
10	Pleural effusion or empyema	10 (3%)
11	Renal disorder	5 (1.5%)
12	Poisoning	5 (1.5%)
13	Others/Miscellaneous	44 (13.1%)
	Total	335

Table 6: Disease profile of 12 COVID positive pediatric patients (classification as given in ICMR guidelines) is as follows.²⁰

Sr. No.	Clinical syndrome	No. of patients	No. of expiry
1	Asymptomatic	1	-
2	Uncomplicated illness	4	-
3	Mild pneumonia	1	-
4	Severe pneumonia	4	-
5	ARDS	2	2
6	Sepsis/ septic shock	0	-
	Total	12	2

A total 2 COVID positive patients expired due to ARDS (acute respiratory distress syndrome) while remaining 10 positive patients were discharged with average hospital stay of 12.4 days. Comparison of mortality profile of COVID and non-COVID patients is given in Table 7. The

number of OPD attended at the pediatric OPD department fell around 10 times from 10,964 in April to June 2019 to 1194 in same months in 2020. Total No. of patients vaccinated last year from April to June were 3293 which fell down around 3 times to 1251 in 2020. Comparison of OPD attendance and immunization of 2 years is given in Table 8 and Figure 1.

Table 7: Mortality profile among COVID and non-COVID patients.

Patients	Total no. of patients	Expiry
COVID patients	12	2 (16.6%)
Non-COVID patients	558	126 (22.5%)
Total	570	128 (2.4%)

Table 8: OPD attendance rates and immunization rates in 2019 and 2020 in the month of April, May and June.

Year	2019	2020
Total no. of OPD attended	April	3543
	May	3850
	June	3569
	Total	10,964
Total no. of patients vaccinated	April	957
	May	1167
	June	1169
	Total	3293

DISCUSSION

Incidence of COVID positivity out of the total patients presenting to the triage was 1.69% in our study, this is comparable to the studies done in other countries. Among pediatric population, in China, 2.2% of confirmed cases of COVID-19 were among children aged less than 18 years, while in Italy it was 1.2%, in US it was 2% and in Spain it was 0.8%.^{6,15-17}

There was a fall of around 5 times in the number of patients presenting to triage in the current year compared to the last year. This could be explained due to the fact that there was lockdown in the Ahmedabad during the study period and parents didn't bring their children for minor ailments to the hospital.

More males presented to the pediatric triage during the study period with male to female ratio of 1.4:1. Maximum number of patients that presented to the triage were neonates (35.5%) and infants (28.6%).

Even during the peak of the pandemic in Gujarat, only 13.7% of total patients presenting to triage fulfilled the criteria of COVID suspect patients. Thus, the major chunk of pediatric admissions and OPD still belonged to the non-COVID conditions. Out of the total admissions in non-

covid hospital, maximum number of admissions were in NICU (39.4%).

Most common clinical presentation among admitted pediatric patients was acute gastroenteritis (19.4%) followed by pneumonia (18.5%) followed by seizure disorder (17.6%) in the non COVID hospital.

Among the total 97 suspected patients, 12 patients were tested COVID positive. Out of these 12 COVID positive patients, 50% had uncomplicated illness or mild pneumonia, while 50% had critical illness in the form of severe pneumonia, ARDS or sepsis and were admitted in COVID ICU. 75% of the COVID positive patients were infants between age 1 month to 12 month. Out of all of the COVID positive patients with critical illness (severe pneumonia, ARDS, sepsis or septic shock), infants less than 1 year comprised 83% and remaining 17% belonged to age group of 1 year to 5 years. Our study matches with that done in US and China that suggested higher incidence of critical cases among infants. In United States, according to a study done by CDC, ICU admission was highest among children less than 1 year (5 out of the total 15 ICU admissions were infants). 3 deaths were reported.¹³ The nationwide cohort from China reports severe and critical cases as 10.6% for <1 year olds, 7.3% for 1-5 year olds, 4.2% for 6-10 year olds, 4.1% for 11-15 years old, and 3.0% for > 15 years old. Thus, more severe cases are reported in children less than 1 year.¹⁴

Mortality among non COVID patients was 22.7%, whereas mortality among COVID positive patients was 16.6%. High mortality among COVID patients in our study could be attributed to the fact that most of the patients presenting in pediatric emergency triage in the tertiary care centre were critical during the pandemic times. Also, due to small sample size of COVID positive patients (N=12), mortality couldn't be commented upon.

There is a drastic fall in number of OPD attended at the OPD department (10 times fall) and immunization rates (3 times fall) this year during ongoing pandemic compared to last year. The fall in OPD attendance rate was much higher compared to vaccination rates. This can have implications in the form of re-emergence of vaccine preventable diseases in the coming times.

Also, poor OPD attendance rates had led to poor follow up of neonates and patients with chronic diseases like asthma, epilepsy, diabetes etc. However, fall in immunization rates was less compared to OPD attendance rates, indicating people did come to vaccinate their child in spite of the lockdown.

CONCLUSION

This study helped us to stand better the incidence, demographic characteristics, clinical profile and outcomes of pediatric patients presenting to tertiary care during the pandemic times among both COVID positive and non-

COVID patients. Incidence of COVID positivity out of the total pediatric patients presenting to the triage was comparable to the studies done in other countries. Even during the peak of the pandemic in Gujarat, the major chunk of pediatric admissions and OPD still belonged to the non COVID conditions. Severe COVID cases and higher mortality were reported in children less than 1 year. The drastic fall in immunization rates this year during ongoing pandemic compared to last year can have implications in the form of re-emergence of vaccine preventable diseases in the coming times.

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