Journal of Pharmaceutical Research International

33(47B): 921-927, 2021; Article no.JPRI.75443
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Epidemiology Clinical Profile and Outcome of Patients with COVED-19 Admitted in a Tertiary Health Care Hospital

Fahima Thasleem Fazlur Rahman[1] and Shami Kumar[2*]

[1]Saveetha Medical College and Hospital, Thandalam, Chennai, India.
[2]Department of Paediatrics, Saveetha Medical College and Hospital, Thandalam, Chennai, India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i47B33208
Editor(s):
(1) Dr. Sawadogo Wamtinga Richard, Scientific Research and Innovation, Burkina Faso, West Africa.
(2) Dr. Paola Angelini, University of Perugia, Italy.
Reviewers:
(1) Snehasis Bhunia, Uttar Pradesh University of Medical Sciences, India.
(2) Mumal Nagwani Mishra, Maharshi Vashishtha Autonomous State Medical College Basti, India.
(3) Qusay Kh. Al-Dulamey, University of Mosul, Iraq.
Complete Peer review History: https://www.sdiarticle4.com/review-history/75443

Original Research Article

Received 10 September 2021
Accepted 14 October 2021
Published 05 November 2021

ABSTRACT

The knowledge of epidemiology and clinical profile is essential to understand the severity of the disease and to come up with timely intervention and proper treatment to reduce the morbidity and mortality caused by it. Severe Acute Respiratory SyndromeCoronavirus2 (SARS-CoV-2) the cause of Novel Coronavirus caused an outbreak in December 2019 in China, Wuhan. COVID-19 was declared to be a global pandemic on 11 March 2020 and it was found to cause pneumonia. This is a retrospective study done by reviewing the medical records of patients admitted to the COVID ward of a tertiary health care hospital in Chennai, Tamil Nadu. This study is focused on the epidemiology, clinical features and outcome of the patients. Patients were admitted based on RT-PCR results, patients aged between 0-17 whose RT-PCR for COVID-19 was positive were included in this study. Furthermore the disease severity, co-morbidities and treatment have also been analysed in this study. Out of 68 children tested 50 of them were positive for COVID-19, whose extensive histories regarding various details were recorded. Among various age groups, the most affected age group was found to be between 5-10 years and between 1-5 years. There was found

to be male predominance in our study. Most of the patients were from the urban area and were from lower socioeconomic status. The mode of transmission in the paediatric age group was straightforward, the disease was contracted from a family member or from travelling to an endemic area. Mild symptoms were predominantly noticed in these children. Fever and sore throat were the chief complaints of most patients. Children with co-morbidities such as asthma, obesity etc… was given special attention as these conditions might increase the risk of severity of the disease. All the children admitted were given symptomatic treatment and a repeat RT-PCR test was taken before being discharged. The conducted study demonstrates that disease severity was mild in children than in adults. Further studies are required to understand the clinical course and early and late complications in children.

Keywords: Paediatric age group; COVID-19; pneumonia; RT-PCR; co-morbidities.

1. INTRODUCTION

The novel coronavirus (COVID-19) is an illness caused by Severe Acute Respiratory Syndrome Coronavirus-2(SARS-CoV-2) as named by the *Coronaviridae* study group of the International Committee on Taxonomy of Virus. It is a single-stranded RNA virus, positive sense and enveloped was first isolated from humans in 1956.Two serious coronavirus disease outbreaks have happened in the past two decades: severe acute respiratory syndrome (SARS) in 2003 [1] and Middle East respiratory syndrome (MERS) in 2012 [2]. The COVID-19 as named by WHO was first reported in December 2019 by China as an outbreak of pneumonia of unknown cause in Wuhan. In India, the first case of this disease was first reported on January 30, 2020. By March 11 2020 COVID-19 was declared a global pandemic and the number of infected cases was substantially increased and was reported all over India. The disease severity was greater in adults when compared to children, within the Paediatric age group neonates and infants were more affected [3]. Large studies that were done in Italy and China have also shown very low case-fatality rates in children and adolescence [4]. In India, only limited data is available on epidemiological features, clinical manifestation and transmission patterns in children with COVID-19. Although the symptoms resembled that of the common cold, SARS-CoV-2 has a more variable clinical course than the former. Covid19 is transmitted directly from person to person by respiratory droplets and potentially uses the ACE2 receptor to infect humans. SARS-CoV-2 has the potential to cause damage to vital organs such as the lung, heart, liver, and kidney, and a high prevalence of pneumonia is found in patients with this infection [5]. The mortality due to this disease was comparatively higher in children with co-morbidities and children with compromised immunity. To understand the varied clinical profiles and physiological patterns, early observation is essential as this disease causes pneumonia which is the leading cause of death in children worldwide. In this article we have discussed the epidemiology, clinical profile and outcome of patients with COVID-19 admitted to a tertiary health care hospital.

2. MATERIALS AND METHODS

This is a retrospective study, done by reviewing the medical records of patients admitted to the COVID ward of a tertiary health care hospital. The case sheets were obtained from the medical reports department after procuring the approval of the institutional ethical committee. The epidemiology and clinical profile are discussed in detail. Furthermore, the outcome of the patients has also been analyzed in this study. All paediatric patients (0-17 aged) with laboratory confirmed COVID-19 were included. All patients who had a cough, fever shortness of breath, chills, muscle pain, the new loss of taste or smell, vomiting or diarrhoea, and/or sore throat and history of exposure to epidemic areas or close contact with the infected individual were screened and the information was documented. SARS-CoV-2 infection was confirmed by RT-PCR, sample was taken usingupper nasopharyngeal and oropharyngeal swabs, collected by trained personnel. Radiographic imaging was reserved only for patients showing symptoms that fell into the category of severe disease. A detailed history was taken to make note of co-morbidities such as Asthma, obesity and cardiovascular diseases ascertain to COVID19. The status of overweight and obesity were defined based on WHO guidelines. The epidemiological investigations were focused on the mode of transmission, recent travel history to the affected countries or in close contact of laboratory-confirmed cases and those who developed respiratory symptoms within 14 days

of home quarantine in accordance with the ICMR strategy for COVID-19 testing in India. Patients above the age of 17 and patients who displayed symptoms but the RT-PCR was negative for COVID were excluded from this study.

3. RESULTS

Between 2020-2021, 68 children were tested for COVID, out of which 50(73.5%) of them tested positive. Children between the age group of 0-17 were taken into consideration, of which 16(32%) of them were aged between 5-10. 32(64%) of 50 children were male. Most of the patients were residents of urban area (76%) belonging to upper lowerclass family (58%). The route of transmission for these paediatric patients were either from family members or relatives (90%) who tested positive for COVID-19, recent travel history (4%) or history of exposure to epidemic areas (6%).

Most of the children presented with either mild symptoms (54%) or were asymptomatic (22%) only 3(6%) had severe disease and 9(18%) had moderate disease.

On admission the most common symptoms were fever (24%) cough (18%) and sore throat (14%). Other symptoms that were recorded infrequently are diarrhea (10%), stomach ache or vomiting (08%), headache and myalgia (04%). No signs of cardiac, liver, or renal failure and no neurological symptoms were recorded.

Symptomatic treatment using Antipyretics, antibiotics, fluid corrections through IV, antiemetic drugs etc… were given. RT-PCR (100%) was done on 14^{th} and 15^{th} day of admission, it came out negative on both days for 42 (84%) of children, who were sent home on the 15^{th} day.

Among the children admitted, 8 of them had comorbidities, 5 of them had asthma (10%), 2 (04%) of them had obesity one child with Down syndrome had Arterioventricular septal (02%) defect.

Table 1. Demographic profile of cases studied

Parameters	Total number N=50	Percentage
Age range	0-17 years	Mean = 8.5 years
Age group		
0-1 year	06	12%
1-5 years	13	26%
5-10 years	16	32%
10-15 years	10	20%
15-17 years	05	10%
Gender		
Male	32	64%
Female	18	36%
Address		
Urban	38	76%
Rural	12	24%
Socio-economic status		
Upper lower class	29	58%
Lower middle class	18	36%
Upper middle class	03	06%
Contact with COVID-19 patients	45	90%
Recent travel history	2	4%
History of exposure to epidemic area	3	6%

Table 2. Disease severity of patients admitted

Disease Severity	Total Number	Percentage
Asymptomatic	11	22%
Mild	27	54%
Moderate	9	18%
Severe	3	06%

Table 3. Various clinical features observed

Clinical Features	Total Number	Percentage
Fever	12	24%
Cough	08	18%
Sore throat	07	14%
Myalgia	02	04%
Headache	01	02%
Stomach ache/ Vomiting	04	08%
Diarrhoea	05	10%

Table 4. Relative comorbidity in admitted patients

Comorbidities	Total Number	Percentage
Asthma	5	10
Obesity	2	4
Cardiovascular disease	1	2

Table 5. Treatment provided and final outcome of the patients

Treatment and Outcome	Total Number	Percentage
Symptomatic treatment	50	100%
Other treatments	13	26%
Repeat RT-PCR	50	100%
Negative on day 14&15	42	84%
Duration of hospital stay :		
15 days	42	84%
18 days	5	10%

4. DISCUSSION

SARS-CoV-2 is a highly contagious virus causing a high prevalence of pneumonia in infected individuals. The mortality rate of all children that were hospitalized with COVID-19 was 0.0018%. Analyzing and understanding the epidemiology, socio-demographic details, clinical features and co-morbidities is vital in paediatric patients for early diagnosis and effective treatment of the disease. In our study, the number of children who tested positive COVID-19 was 50, when compared to the number of children tested, the ratio is relatively high. Children within the age group of 0-17 were included of which the majority of patients were between the ages 1-5, in contrast, a similar study done in India showed that children between the age group of >1-5 were more affected [6]. There is a slight male predominance in terms of children affected, supporting the data of the research done by Dinagul Bayesheva et al [7]. Although there is no medical or scientific explanation, the differential increase in male sex ratio as compared to the female sex ratio in recent times might be a factor pertaining to this situation. COVID-19 is a rapidly spreading infection affecting more than 27 million people all over India, The lower socioeconomic class of people (according to the modified Kuppuswamy scale) were significantly more affected than other classes, a similar pattern has also been observed in other countries [8]. The difference in population distribution in urban and rural areas has been hypothesized to be the reason for an increase in the number of cases in the former than latter in our studies, one other study was done in Kazakhstan [7] was in accordance with our study. According to a study the mortality rate of all children that were hospitalized with COVID-19 was 0.0018% [9]. It is still ambiguous why the majority of children with COVID-19 have the less severe disease than adults, it is speculated that they may have higher levels of antibody against the virus than adults or that their developing immune systems may respond to pathogens differently but more effectively than adult immune system [10]. Although asymptomatic patients were admitted to be hospitalised according to ICMR strategy, children with relevant symptoms but negative

RT-PCR were sent home and advised isolation, here we should take into consideration, false-negative results, unprofessional or improper collection of samples, usage of less sensitive and less adequate home tests etc... A study done by Zhen Zhang et al in China suggested that the PCR tests missed 48 (36%) out of 134 infected close contact the author wrote that Even rigorous [PCR testing] protocols might miss a substantial proportion of SARS-CoV-2 infections, perhaps in part due to difficulties in determining the timing of testing in asymptomatic individuals for optimal sensitivity [11]. The mode of transmission in these cases was pretty forward, the infection was either contacted from close relatives residing in the same house or the neighbourhood, implying that the identification of these patients was straightforward. However previous studies done in other countries showed that the transmission route of SARS-CoV-2can is highly variable [12] compared with MERS coronavirus, which is less transmissible [13]. Recent history of travelling was elicited in 2 patients. A study published by Chen et al, case series of a total of four infants born to mothers with COVID-19 in which none of three infants tested was positive for the virus nor developed clinical symptoms of disease, suggests a low likelihood of vertical transmission of the virus [14] other reason pertaining to this situation could be due to less exposure to SARS-CoV-2 due to social isolation and closure of schools; lower frequency of co-morbidities and exposure to smoking when compared to adults and greater capacity for pulmonary regeneration [15] In our study, among the children admitted the majority of them had either mild symptoms or were asymptomatic, many other studies regarding the same were in accordance with our study [16]. The most common co-morbidity that was observed among these children was Asthma, 5 children with this disease had mild disease and 1 of them had moderate disease and the other child who had asthma was also obese and had severe disease. It is still unclear whether asthma increases the risk of infection or influences the disease severity in otherwise healthy children suffering from this disease [17]. A recent statement from EEACI section on Pediartics [18] quoted that patients with asthma (particularly severe and uncontrolled asthma) and immunosupression have also been classified to be at increased risk of developing severe COVID-19, but this rather based more on common sense than mounting evidence. A child with Down syndrome was a known case of cardiovascular disease, atrioventricular septal defect (ASD) for which he was under regular treatment. It is a well known fact that patients with Down syndrome and CHD are at high risk of developing viral infections and often have significantly increased rate of morbidity and mortality [19] even so, an article written by Usha et al highlights that the disease severity and clinical presentation maybe variable depending on the unique alterations to the immune system associated with Down syndrome [20]. However presence of heart disease alone is considered a risk factor for disease severity in COVID-19. Obesity was diagnosed in 2 children after they were admitted in the hospital for COVID using BMI which was calculated with patient's height and weight. This was considered an important co-morbidity our study because various countries with extensive study population have included obesity to be a major disease altering co-morbidity. In Canada obesity was the third most prevalent demographic factor among children admitted to the ICU, behind only those with serious associated diseases, immunosupression and cancer [21]. All the patients who were admitted were given symptomatic treatment with drugs such as paracetamol (antipyretics) Azithomycine (antibiotics) in patients when bacterial super-infection was suspected, IV fluids and electrolyte management especially in patients with vomiting and diarrhoea, antiemetic such as ondensetron and domperidone were used when the symptom persisted. Oxygen inhalation, drugs like Lopinavir, remdesivir, hydroxycholoquine etc… were given in patients with severe disease and in patients with moderate disease whose condition did not improve with symptomatic treatment. As per PRAD criteria the patients were kept in isolation for 14 days, repeat RT-PCR tests were taken 24 apart and patients who tested negative on both days were sent home. For patients whose RT-PCR result was not negative on either one of the repeat tests, another test was taken after 3 days, if the results came out negative the patient was discharged. Public health authorities were informed for contact tracing. There were no mortalities.

5. CONCLUSION

With the available data, we can infer that this disease has milder course and better outcome in children rather than in adults. Since community transmission of SARS CoV-2 continues, hospitals and health care providers must be ready to manage the variable presentations and immediate and late complications of COVID-19. The testing strategy must be strengthened and

the ICMR protocols are to be followed meticulously in all hospitals. Additional care should be given for children with co-morbidities. Extra precautions should be taken with personal hygiene, social distancing and personal protective equipments in order to prevent further community spread.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The case sheets were obtained from the medical reports department after procuring the approval of the institutional ethical committee.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Donnelly CA; Ghani AC; Leung GM; et al. Epidemiological determinants of spread of causal agent of severe acute respiratory syndrome in Hong Kong. Lancet 2003
2. Cauchemez S; Fraser C; Kerkhove , Van et al. Middle East respiratory syndrome, coronavirus: quantification of the extent of the epidemic, surveillance biases and transmissibility. Lancet Infect Dis 2014; 14: 50–56.
3. Zachariah, Philip; Johnson, Candace L; Halabi, Katia C; et al Epidemiology, Clinical Features, and Disease Severity in Patients With Coronavirus Disease 2019 (COVID-19)in a Children's Hospital in New York City, New York
4. Onder G; Rezza G and Brusaferro S. Case-Fatality Rate and Characteristics of Patients Dying in Relation to COVID-19 in Italy. JAMA, 2020.
5. Hamming I; Timens W; Bulthuis ML; Lely AT; Navis G; Goor, van H. Tissue distribution ofACE2 protein, the functional receptor for SARS coronavirus: the first step in understanding SARS pathogenesis. J Pathol 2004; 203: 631–37.
6. Sarangi, Bhakti; Sandeep-Reddy, Venkat; Oswal, Jitendra S; Malshe, Nandini; Patil, Ajinkya; Chakraboth, Manojit and Lalwani, Sanjay. Epidemiological and Clinical Characteristics of COVID-19 in IndianChildren in the Initial Phase of the Pandemic
7. Bayesheva, Dinagul; Boranbayeva, Riza; Turdalina, Bayan; et al COVID-19 in the paediatric population of Kazakhstan
8. Coronavirus Disease 2019 (COVID-19). Centers for Disease Control and Prevention. Accessed June20, 2020
9. Patel, Neha A et al Pediatric COVID-19: Systematic review of the literature
10. Dong Y et al. Epidemiology of COVID-19 among children in China. Paediatrics
11. 2020;145:1–10
12. Zhang, Zhen; Bi, Qifang; Fang, Shisong; Wein, Lan; Wang, Xin; He, Jianfan et al. Insight into the practical performance of RT-PCR testing for SARS-CoV-2 using serological data: acohort study.
13. Tang B; Bragazzi NL; Li Q; Tang S; Xiao Y; Wu J. An updated estimation of the risk of transmission of the novel coronavirus (2019-nCov). Infect Dis Model 2020; 5: 248–55.
14. Al-Tawfiq JA; Kattan RF; Memish ZA. Middle East respiratory syndrome coronavirus disease is rare in children: an update from Saudi Arabia. World J Clin Pediatr; 2016.
15. Chen Y, et al. Infants born to mothers with a new coronavirus (COVID-19). Front Pediatr 2020;8:104
16. Dhochak N; Singhal T; Kabra S; Lodha R. Pathophysiology of COVID-19: why children fare better than adults? Indian J Pediatr. 2020;87:537–546.
17. Qiu, Haiyan; Wu, Junhua; Hong, Liang; Luo, Yunling; Song, Qifa and Chen, Dong. Clinical and epidemiological features of 36 children with coronavirus disease 2019 (COVID-19) in Zhejiang, China: an observational cohort study.
18. Streng A; Hartmann K and Liese JG. COVID-19 in hospitalized children and adolescents
19. Jose A; Castro, Rodriguez and Forno, Erick. Asthma and COVID-19 in children - a systematic review and call for data.
20. Stagliano DR; Nylund CM; Eide MB et al. Children with Downs yndrome are high-risk for severe respiratory syncytial virus disease. J. Pediatr. 2015;166: 703–709.
21. Krishnan, Usha S; Krishnan, Sankaran S; Jain, Shipra et al. SARS-CoV-2 Infection in Patients with Down Syndrome, Congenital Heart Disease, and Pulmonary

Hypertension: Is Down Syndrome a Risk Factor?

22. Shekerdemian LS; Mahmood NR; Wolfe KK; Riggs BJ; Ross CE; McKiernan CA. Characteristics and outcomes of children with coronavirus disease 2019 (COVID-19) infection admitted to US and Canadian pediatric intensive care units. JAMA Pediatr. 2020;174: 868–873.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle4.com/review-history/75443