



COVID-19 Disease in the Paediatric Population: A Cross Sectional Study at the University Teaching Hospital in Port Harcourt, Southern Nigeria

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Authors' contributions

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

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ABSTRACT

Background: Globally, there has been a destruction of human lives, economies and health systems by the novel corona virus pandemic. Presently there is no known certain cure, although a number of vaccines have been proposed to prevent the corona virus disease 2019 (COVID-19) which was first seen as increasing number of pneumonia cases in Wuhan, China, with severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) as the causative organism.

Objectives: To screen paediatric patients for COVID-19 at the University of Port Harcourt Teaching Hospital and to know their pattern of presentation.

Materials and Methods: Descriptive cross-sectional study, not controlled, over a period of six weeks, using interviewer administered structured questionnaire which was adapted and used at the Accident and Emergency Department for patients triaging as a COVID-19 Risk assessment tool. No action was required for a score of 0-7, while admission into COVID-19 holding area following review by IDU was recommended for a score 8 \geq 17. All children brought into the department, requiring treatment were screened.

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Results: There were 131 patients, 74 (56.5%) males and 56 (42.7%) females, with a mean age 7.2 ± 5.41 years. Male: Female ratio was 1.3:1. Four children (3%) had a total score of ≥ 8 , while half of them ($n=2$; 50%) tested positive for COVID-19, giving a disease prevalence of 1.5%. Both cases were females; fever and difficulty in breathing were the commonest symptoms. No mortality was recorded.

Conclusions: COVID-19 prevalence is low in children, and they have a good outcome. A community-based study is recommended.

Keywords: COVID-19; SARS-CoV-2; paediatric population.

1. INTRODUCTION

The coronavirus disease, also known as COVID-19, was first seen as an increase in presentation of people with pneumonia in Wuhan, China in December 2019. The disease, for which there is currently no sure cure, is caused by a new strain of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was subsequently recognised as the virus causing this pneumonia [1-2]. By 14th February 2020, despite changes in life style and behaviour that have been required to prevent the spread of COVID-19, the disease spread globally with destruction of lives, health systems and finance, to many African nations including Nigeria. [3-4] This resulted in infections, and deaths of millions of people, enormous interruption in people's social lives and financial ruin. [3-4]. No one single illness has caused such enormous destruction of human lives and economy in recent years, with death toll that has been worse with adults when compared to the paediatric population. Besides, as an indirect effect of the coronavirus pandemic, access to routine health care and food have greatly reduced, resulting in upsurges in mother and child deaths globally but especially in developing countries [4].

By May 2020, the African Centre for Disease Control and Prevention reported 54,027 cases of coronavirus infections, 18,636 cases recovered while 2,074 died. Sixty-five percent of these deaths were recorded in about 10 countries in North and West Africa, which had available reports and not necessarily the most affected nations in those regions [5].

As a new viral infection, its presentation is still evolving. However, paediatric patients have been the least affected by COVID-19, with over ninety percent of them having none, or mild to moderate symptoms of the infection [6], while the median age of African residents with coronavirus infection was found to be 19.7years [7]. This would result in tilting of the coronavirus infected

population to adolescence age group among the African population, which is a drift from the norm in other areas [7]. Though the testing for COVID-19 is not widespread in many African countries because of limited resources, the percentage of paediatric patients less than eighteen years of age infected with coronavirus in some African nations with available statistics ranges from 0–10% [7].

There is a dearth of literature on Coronavirus infection in paediatric patients in Nigeria, and also at the University of Port Harcourt Teaching Hospital, to the best of our knowledge, so the need for this study.

2. OBJECTIVES

The objectives of this study were to screen all paediatric patients at the University of Port Harcourt Teaching Hospital (UPTH) for COVID-19, using the screening tool that was adapted and used at the hospital Accident and Emergency Department for triaging patients; test all suspected cases to know the pattern and presentation of COVID-19 in positive cases; and establish a baseline data for COVID-19 among paediatric patients in our hospital. These data will be used in monitoring and evaluation of the disease at the UPTH.

3. METHODOLOGY

This descriptive cross-sectional, not controlled study was carried out at the UPTH, which is an 800-bedded federal tertiary health institution serving Rivers and the neighbouring States in the southern parts of Nigeria. The hospital serves as a general/referral centre for children in Port Harcourt and its environs.

At the Department of Paediatrics, the Children's Outpatient Clinics are run on week days and cater for children 0–17 years who do not have emergency/life threatening problems. These children are seen in the clinics and sent home or admitted into the paediatric wards if indicated.

There is also a children's emergency ward where the children with life threatening emergencies are quickly attended to and when stable they are transferred to children medical wards where they would remain until discharge. There are two of such wards, children medical wards one and two.

The study was carried out between May and June 2020. It was a period when the hospital experienced a drastic reduction in patient turnover, especially of those visiting for preventive and non-essential health services because of the pandemic's preventive measure of lockdown for COVID-19 in Port Harcourt, Rivers State where the study was carried out on one hand, and the fear of contracting the infection in the hospital on the other hand.

A risk assessment tool, which was adapted and used at the Accident and Emergency department of the hospital was used for the study, with the permission of the head of Department of Paediatrics. This risk assessment tool had a list of 9 symptoms with scores assigned to them when present.

A score of 1 was attributed to each of the following symptoms:

- cough of recent onset within the last 14 days
- catarrh/running nose of recent onset within the last 14 days
- sore throat
- diarrhoea
- body pain
- headache

Each of the following symptoms earned a score of 2:

- fever
- difficulty in breathing of recent onset within the last 14 days
- easy fatigability

In addition, any of the following histories attracted a score of 3:

- any travels within the last 14 days
- contact with any individual who tested positive for COVID-19
- symptoms unexplainable by an alternative diagnosis

A patient with a total score of 0-7 needed no action in respect of COVID-19, and was subsequently treated for whatever condition he/she presented with. A patient with a total score of ≥ 8 was a COVID-19 suspect and was admitted into the department's designated holding area for COVID-19, and the hospital's Infectious Disease Unit (IDU) was invited to review the patient at the holding area and collect the patient's sample for laboratory testing. Patients remained at the holding area until test results were made available, which lasted a minimum of 48 hours. Those who tested positive were then transferred to the COVID-19 treatment centre of the UPTH for further management, while those who tested negative were discharged from the holding area to continue with their care as appropriate.

4. RESULTS

One hundred and thirty-one subjects participated in the study; their ages ranged from 2 months to 17 years, with a mean age of 6.4 ± 5.5 years, and a Male: Female ratio of 1.3:1 Table 1.

Table 1. Demographic statistics of patients screened for covid-19

Characteristics	Frequency	Percent
Age in years		
< 5	47	35.9
5-9	22	16.8
≥ 10	49	37.4
Not mentioned	13	9.9
Total	131	100
Sex		
Male	74	56.5
Female	56	42.7
Not mentioned	1	0.8
Total	131	100

A total of 4 children (3%), including 2 males (9 and 15 years old) and 2 females (1 and 12 years old), scored ≥ 8 with the screening tool, were reviewed by the IDU and had laboratory testing for COVID-19, among which 2 children (50%) tested positive to COVID-19, giving a disease prevalence of 1.5% Table 2. Both cases were females, aged 1 and 12 years. There was a 100% recovery rate from COVID-19 positive cases.

All children who tested positive to COVID-19 presented with fever (100%) and difficulty in breathing of recent onset, within the last 14 days (100%) and 1 of them also had easy fatigability

(50%) Fig. 1. None of them had a history of contact with a COVID-19 positive patient or recent travel.

Table 2. Scores obtained with screening tool and prevalence of COVID-19 infection

	Number	Percent
Scores with screening tool		
0 - 7	127	96.9
≥ 8	4	3.1
Total	131	100
COVID-19 positive		
Yes	2	1.5
No	129	98.5
Total	131	100

5. DISCUSSION

There was a 1.5% prevalence of COVID-19 infection among paediatric patients screened in this study, which falls within the 0-10% obtained in the few African countries where data is accessible for COVID-19 in children less than 18 years [7].

There was no mortality among the paediatric cases who tested positive for coronavirus in this study, which is similar to the report of a study from Wuhan, China, where no mortality was recorded among 416 coronavirus positive cases aged 9 years or less, and only 1 recorded among 549 patients aged 10-19 years, though the present study had a smaller sample size [6].

The age range of coronavirus positive cases in this study was 1-12 years and they were both females, whereas others have reported age range of 2 to 13 years, which were higher than what we obtained, with no significant gender difference [8]. Besides, coronavirus affecting infants as was seen in this study has also been reported [9]. Though no neonate in the present study had a score above 7, and contrary to initial reports [8,9], findings suggesting a possible vertical transmission of Covid-19 are increasingly reported [10,11]. However, current evidence states that the coronavirus is not transmitted via breastmilk [12], which led to the WHO’s recommendation that mothers who are COVID-19 positive should breastfeed their babies while observing all the preventive measures such as wearing face mask appropriately while breastfeeding, washing hands as much as required, using hand sanitizers frequently [13-19].

In previous studies among paediatric patients, more than 90% of the cases had no symptoms, and when symptoms did occur, they were mild to moderate in nature [4,8]. Two reasons have been given for the low presentation in children, which include their immature immune system, and the angiotensin converting enzyme 2 receptor through which the virus enters cells, may be expressed differently in children [8,19]. In the present study however, all children who tested positive for COVID-19 were symptomatic as screening asymptomatic children was beyond the scope of this study.

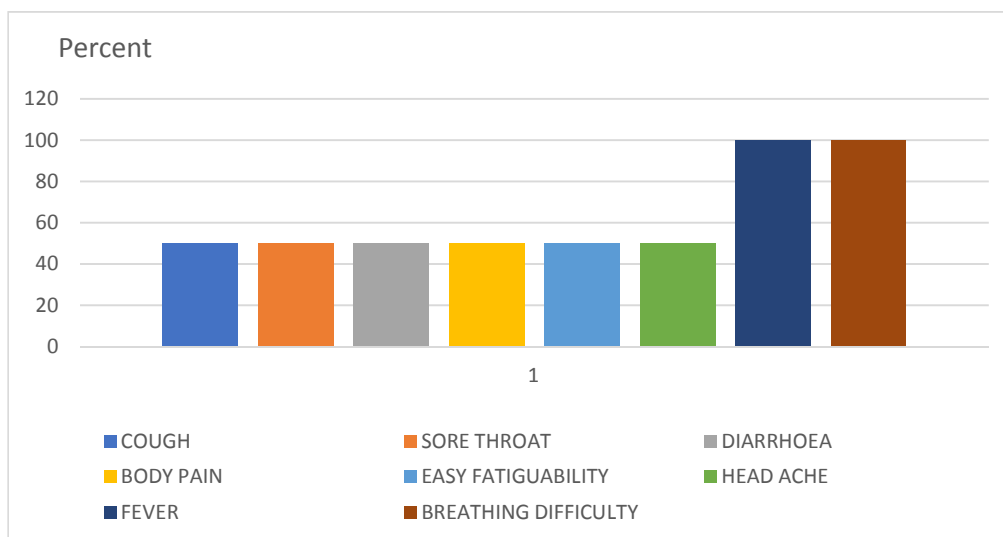


Fig. 1. Pattern of presentation of COVID-19 positive subjects

Fever and difficulty in breathing, which have been reported in literature as features of coronavirus disease, were found in the 2 children who were positive for COVID-19, and cough was present in 50% of them. However, previous studies have reported that fever and cough were the most common presentations in children [19]. This variance could be attributed to the small sample size of this series. Other symptoms of COVID-19 in children as reported in literature include, fatigue, sore throat, headache and muscle pain. There may also be non-respiratory manifestations with features of digestive system involvement such as nausea, vomiting, abdominal pain and diarrhoea may occur in isolation, some of which were also recorded in the present study. [4]

The severity of the disease can be graded into asymptomatic; mild cases with features of acute upper respiratory tract infection such as cough, sore throat, runny nose, and sneezing with or without fever; pneumonia is a feature of a moderate case; while severe cases have a combination of symptoms such as fever and cough, respiratory distress with desaturation, with gastrointestinal symptoms such as diarrhoea. In critical cases, there is progression to acute respiratory distress syndrome (ARDS) or respiratory failure, there may also be shock, encephalopathy, myocardial injury or heart failure, coagulation dysfunction, and acute kidney injury. Organ dysfunction can be life threatening. [4]

Although 131 children were screened in this study, only 4 were tested for COVID-19. Because of inadequate resources, there was need to develop a means of screening patients and testing only those who were COVID-19 suspects based on their clinical presentation. Thus, the screening tool developed by the hospital. The function of laboratory testing during the pandemic is to confirm the infection in suspected cases, screen for COVID-19 among contacts of cases and map the extent of spread, identify the presence of clusters, the scope of community transmission and monitor clearance of COVID-19 in formerly confirmed cases. However, there is a significant lag in testing in most low- and middle-income countries due to inadequate testing materials, with the subsequent constrain to perform targeted testing as was done in this study [19]. This will result in failure to detect asymptomatic cases and underreporting of the actual number of cases, which may be the case in this report. A community-based study among

children to ascertain the claim that the infection is low in children may be subject for a future study.

6. CONCLUSIONS

Among children in our hospital, the prevalence COVID-19 was 1.5%, females were more affected, fever and difficulty in breathing were the commonest symptoms and the disease had a good prognosis. The continued promotion of preventing measures for COVID-19, including frequent hand washing with soap and running water, using hand sanitizers, wearing of face masks and practising social distancing in our communities and public places, is recommended.

CONSENT

A written informed consent was obtained from the parents/caregivers of the children in this study, and when applicable, consent from the children.

ETHICAL APPROVAL

An Ethical approval has also been obtained from the ethics committee of the hospital where this study was carried out.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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