

Reduced Admissions in the Children's Emergency Room during Coronavirus-19 Pandemic in the University of Port Harcourt Teaching Hospital, Nigeria

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Abstract

Background: Coronavirus Disease (COVID-19), the novel global pandemic that was first reported in Wuhan, China, in 2019, and subsequently in Nigeria in 2020, and its negative impact on child health has been receiving attention in the past years. One such impact was the reduction in hospital admissions during lockdown. **Aim:** This study set out to evaluate the effect of the COVID-19 pandemic on the children's emergency ward attendance from January to July 2020 and that of the preceding year. **Materials and Methods:** Hospital records of admissions from January to July 2019–2020 were extracted and exported into IBM SPSS 24 for Mac. The diagnosis was coded using the international classification of diseases. The complex diagnoses were recoded based on the severity or chronologically important ones. **Results:** There was 6.6% fewer admissions in 2020 compared to 2019 ($P = 0.009$). The duration of illness prior to presentation, cases of acute respiratory infection, severe malnutrition, and gastroenteritis was higher in 2020. **Conclusion:** This study showed the impact of COVID-19 on child health vis-à-vis delay in hospital presentation, reduced hospital admissions, increase in various illnesses when compared to the preceding year as a result of increase in the risk factors that would ordinarily have been mitigated pre-COVID-19.

Keywords: Admissions, children, coronavirus disease, emergency, Nigeria

INTRODUCTION

Coronavirus disease (COVID-19) was first diagnosed in Nigeria in March 2020, and thereafter, about 100,000 cases have been recorded which is lower than projected for the country and the region despite 1 million tests done thus far.^[1] Children have been relatively spared with few numbers in Nigeria and the world. However, schools, religious houses, shopping malls, gymnasium, sports complexes, and many businesses were shut down for over four months.^[2-6] Children were confined indoors with little physical and mental activities. Within the same period, hospitals and clinics were open to emergency care only, and children were told to visit the hospital only if their illnesses were unbearable and they had contacted their doctors first with an appointment. Decrease in hospital presentation for diseases would mean increasing home care for these diseases, and it is known that delays in presentation cause increased morbidities and mortalities.^[7]

The public and teaching hospitals were scantily patronized by patients, and virtual medicine using smartphones and telemedicine became norm.^[8] In many countries, there were dramatic decreases in the number of admissions in the emergency rooms ranging from 73% to 88% in Italy compared to the 2018 and 2019 admission rates.^[4] During this period also, doctors and many health-care workers contracted the COVID-19 disease, so the possibility of transmitting to their patients was high, which informed the decision to reduce the hospital attendance. The usual yearly admission rates in the

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emergency room are 2000/year which is approximately 160/month. Yearly mortality rate in the paediatric department is 78/year.^[7] We postulated that there will be decline in the admission rates and mortality during this period.

We carried out this audit to evaluate the effect of the pandemic on clinic and emergency room attendance in our hospital from January 1, 2020, to July 31, 2020, and compare this with those of the previous year (2019).

MATERIALS AND METHODS

This retrospective descriptive study took place in the Children emergency ward (CHEW) of the University of Port Harcourt Teaching Hospital Previous records of hospital admissions, deaths, and discharges from the year 2019 to 2020 were extracted into a database. The CHEW is open 24hrs a day and 365 days in a year, with full coverage of paediatricians, residents, and nurses. Daytime admissions are from 8:00 am to 4:00 pm, after which a nighttime shift commences. All patients that need emergency care are admitted by the residents and initial management protocols are commenced immediately, while informing the on-call consultant of the situation to review.

Data collection and analyses

The CHEW resident extracted the data from the case folders of all patients admitted, and these included age and sex, date of admission, duration of admission, duration of illness before hospital presentation, weight and length/height, and diagnosis. The duration between admission and final diagnosis from investigation and clinical presentation and the diagnosis and outcome were also extracted. Data were then exported into IBM SPSS version 24 IBM Inc. (Armonk, New York, USA) for Mac, and the diagnoses were coded using the International classification of diseases-10. The complex/compound diagnoses were recoded into simpler ones based on the most severe or the chronologically important ones, i.e., gastroenteritis with meningitis was coded as meningitis, but gastroenteritis with metabolic acidosis, was re-coded as gastroenteritis.

Statistical analysis

Chi-squared test was used to compare categorical variables, while Student's *t*-test was used for continuous variables, and $P < 0.05$ was considered statistically significant.

Ethical considerations

As this was a clinical audit and did not involve using human subjects and only data, ethical approval was not requested for.

RESULTS

There were 1,557 admissions during the period of interest between January and July 2019 (830) and 2020 (727), and the difference between these two years was significant in proportion, $\chi^2 = 6.814$, $P = 0.009$. There were 6.6% fewer emergency admissions in 2020 compared with the 2019 average in the months under review. There was only one

COVID-19 case presenting with respiratory symptoms in this cohort in the year 2020.

With a wide age range, 0.08–17.00 years, the median age of the study population was 2.00 years and there were significantly more males 58.1%, $\chi^2 = 41.10$, $P < 0.001$. When we compared daily visit frequencies between 2019 and 2020, we observed a striking reduction in the number of patients presenting to the CHEW after March 2020, when school closures and a nationwide lockdown began, as against the previous two months (January and February) where the admission rates were significantly higher [Figure 1].

Case counts of specific diseases and differences between the two years under review.

Children presented with the common diseases during the period under review, consisting of malaria, bronchopneumonia, gastroenteritis, sickle cell disease, and malnutrition. The frequency of severe acute malnutrition did not differ significantly between the two years under review, $P = 0.460$ [Figure 2 and Table 1].

DISCUSSIONS

The reduction in admissions in our institution was marked and similar to findings in other studies.^[2,4,9] This reduction was due to Government lockdowns, which were done to prevent spreading of the disease and stretching hospital supplies and personal protective supplies (PPE). Many patients were thus given emergency care and management and allowed home to complete recuperation soon after. Our data show a 29% increase in bronchopneumonia admissions in 2020, compared to 2019. This is possibly because of the prolonged

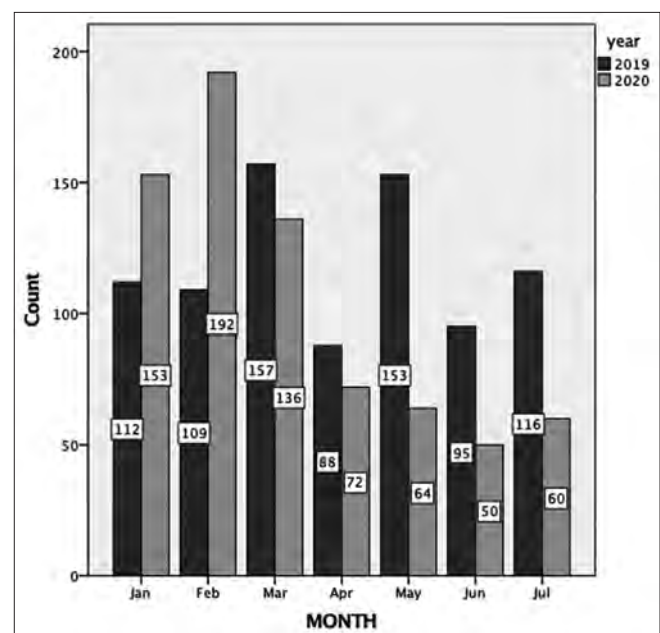


Figure 1: The frequency distribution of admission rates from January to July 2019 and 2020. Note the increase in admissions in January and February, but subsequent decreases thereafter

Table 1: Demography and clinical characteristics of patients

Variable	2019 (n=830)	2020 (n=727)	Total (n=1557)	t/ χ^2	P
Mean age years (SD)	4.42 (4.83)	4.36 (4.75)	4.39 (4.79)	0.806	0.0059
Sex of respondents, male (%)	463 (51.2)	442 (48.8)	905 (12.3)	0.487	0.485
Duration of illness (days)	4.31 (3.80)	5.01 (4.73)	43.26 (10.30)	-3.16	0.001*
Duration of admission (days)	3.27 (1.29)	2.61 (1.35)	-0.96 (0.91)	9.82	<0.001*
Case count of specific diseases					
Bronchopneumonia	26 (35.6)	47 (64.4)	73 (100)	6.041	0.014
Gastroenteritis	57 (35.2)	105 (64.8)	162 (100)	14.22	<0.001*
Meningitis	58 (51.8)	54 (48.2)	112 (100)	0.143	0.705
Malaria	47 (53.4)	41 (46.6)	88 (100)	0.409	0.522
SAM	30 (45.5)	33 (54.5)	66 (100)	0.545	0.460
ARI	110 (61.3)	53 (38.7)	163 (100)	19.9	<0.001*
Sickle cell anemia	62 (43.7)	80 (56.3)	142 (100)	2.282	0.131

SD: Standard deviation, SAM: Severe acute malnutrition, ARI: Acute respiratory infection

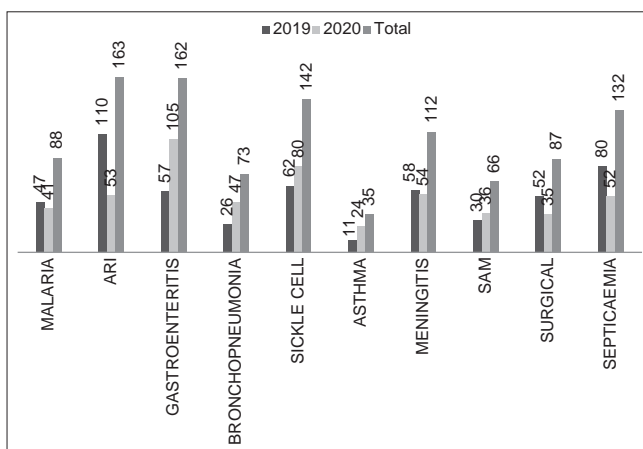


Figure 2: Frequency distributions of specific diseases diagnosed in 2019 and 2020. Reductions were noticed in Malaria, ARI, meningitis, surgical cases, and septicemia, but other conditions had increases in their frequencies. ARI and gastroenteritis were the only conditions with significant changes in their frequency distributions. ARI: Applied research international, SAM: Severe acute malnutrition

periods of stay indoors, overcrowding, and consequent increase in over-exposure to biofumes during cooking.^[10,11] These established risk factors for pneumonia may have led to the increase in pneumonia admissions as reflected by our data. Parental fear and anxiety concerning the respiratory symptoms noticed in the child could have been attributed to the coronavirus infection, causing them to present to the hospital rather than self-medicate or patronize patent medicine shops. Dopfer *et al.* also reported an increase in respiratory tract infections during the pandemic, despite a general reduction in paediatric admissions.^[2]

Acute upper respiratory tract infections were less prevalent in our emergency room by 35% in 2020 compared with 2019. Increased physical contact between children especially in schools, and spread of secretions by touch or air are the major means of transmission of applied research international (ARI). Lockdown strategies employed to reduce the spread of the coronavirus in the form of school closure, social distancing,

hand hygiene, and restriction of public gatherings led to the dramatic decrease in most communicable diseases.^[11-13] The possibilities that many patients got medications across the counter without doctors' prescriptions or that parents pressured doctors to give antibiotic prescriptions to reduce the anxiety of home care are high.

A corresponding decrease in Asthma admission would have been expected with the reduction in ARI; however, there was a steep increase (40%) in asthma presentation and admissions to our CHEW in contrast to other studies.^[14-17] This may be explained by poor access to reliever medication and poor attendance to routine asthma clinic to regulate medications based on severity. The later part of the study (March–July) is the beginning of the rainy season which also coincides with the spring season that is associated with a surge in pollens and viral agents known to trigger off asthma. The home overcrowding rate in Nigeria is beyond threshold as many children sleep in inappropriate homes with poor ventilations, causing inhalation of oxygen-poor air, and many biofumes that cause irritation. The 2018 National demography and health survey (NDHS) revealed that 69% of households cook with solid fuel, out of which 61% use wood thereby increasing the risk of fumes inhalation and airway irritation. This will also inadvertently increase the number of hospital visits for asthma treatment.

The lack of movement should ordinarily have reduced children's exposure to biofumes in the environment, but the emotional strain that may have occasioned staying in an already stress-filled home may have triggered emotionally induced hyper-reactive airways. Witnessing violence and domestic abuse were also known to have increased among children in the world and Nigeria. Many scholars have suggested psychological evaluation and treatment of children who may have undergone these traumatic events during the lockdown to reduce their long-term complications.^[18-21]

More than twice the number of children presented to our CHEW for gastroenteritis during the pandemic in 2020. This is in contrast to reports from other studies that recorded decrease in gastroenteritis during the lockdown period.^[22] Most cases of

gastroenteritis should be managed at home with the use of oral rehydration salts (ORS) and zinc tablets, using the treatment A plan of the WHO guidelines. However, with the enforcement of strict lockdown guidelines, pharmacies and patent medicine shops were locked during the day, preventing access to basic medication. This may account for the increased presentation of diarrhoea illnesses. Cases of gastroenteritis are more likely during the dry season as a result of decreased water supply. For households who relied on water from tanker water trucks, bottled water from departmental stores or even rainwater, this lockdown period reduced their sources of water and possibly increased the susceptibility of children to diarrhoea diseases. Usually, home remedies with a salt sugar solution or ORS and zinc reduce the frequency and duration of diarrhoea; however, when these are not available, the children become sicker and have to present to the hospital.

Anecdotally, the COVID-19 pandemic is expected to increase all forms of malnutrition^[10,11,23-25] from loss of family income due to the global economic recession, soaring food prices and food shortages, and poor transportation of food from the farms to the urban areas. There was a 9% increase in severe acute malnutrition in our study. The lockdown of the nation between March and July 2020 reduced the food productivity capacity, and in a country already grappling with food insecurity and poverty, there was no escaping the malnutrition that was recorded. The problems that usually follow the management of malnutrition in children increased as most patients who were managed did not follow the full protocol and four phases of management as the risk of contracting COVID-19 made early discharge a mandatory policy. Treating emergency and starting nutritional rehabilitation were the key protocols that were enforced, and patients were discharged when emergency conditions were addressed.

Paediatric surgical admissions were reduced by 19% during the pandemic; this was less than what was obtained in a national survey among paediatric surgeons in Nigeria, where there was a 31% drop in all surgical cases. Reasons for this decline included lack of PPE for the theater staff, lockdown, and social distancing strategies put in place to reduce the spread of the disease.^[26,27] During the pandemic, many elective surgical cases were suspended, and emergencies were taken on case-to-case basis. Lack of information about what happened to many children who needed surgical intervention and could not achieve this should be studied in some qualitative manner to put in place, safeguards that will prevent such recurrence in case of any other pandemics.

Like asthma, sickle cell anaemia vaso-occlusive crises are occasionally triggered by stress and so an increase in the admission of children with sickle cell was not unexpected. There was a 40% increase in admissions from sickle cell anaemia, many of them needing blood transfusion and pain medications even though these management protocols were strained as many of the drugs were not available, and donor blood was scarce.

Many aspects of the discussion are completely out of the context of this study.

CONCLUSION

Though this study has highlighted the reduced number of childhood illnesses posed by enforcing lockdowns during a pandemic, what is not known is the number of children who were sick but did not present to the hospitals due to the lockdown accessibility issues or financial constraints. Limitation of study: The study did not find the potential number of deaths that may have occurred in the communities in and around the tertiary hospitals that were open to care.

The duration of illness before presentation to the hospital was longer in the latter (2020) than the former (2019) year mostly because the lockdown protocol advised that patients call their doctors before going to the hospital and were only allowed to make the trip when the condition was critical. Conversely, the duration of hospital admission before discharge home was shorter in the latter than the former years.

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Conflicts of interest

There are no conflicts of interest.

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