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ORIGINAL ARTICLE

Impact of the COVID-19 pandemic on pediatrics epidemiology

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Abstract

Objectives: To assess the impact of the coronavirus pandemic on pediatric epidemiology in children's emergency rooms. **Methods:** A retrospective, descriptive observational study was carried out. The following were evaluated: the number of visits, the rate of hospitalization in the months of March, April and May of 2019, as well as the most frequent pathologies. These were compared with data from the same period in 2020. **Results:** There was a 70% reduction in the demand for pediatric care during the coronavirus pandemic period. The most common pathologies found were respiratory diseases, such as acute viral bronchiolitis and acute bronchitis. There was a decrease in hospitalizations for cases of acute viral bronchiolitis due to respiratory syncytial virus in 2020. Also, in the same year there was an increase in hospitalizations for acute bronchitis, suggesting epidemiological changes generated by social isolation. The number of hospitalizations for traumatic brain injury also increased in 2020. **Conclusion:** The COVID-19 pandemic appears to have had an impact on pediatric epidemiology, reducing the number of visits and hospitalizations.

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INTRODUCTION

Viral disease season in pediatric care units flares up in different months of the year, depending on where you are in the nation. In the Brazilian Southeast, respiratory diseases such as acute viral bronchiolitis and acute bronchitis occur around the period ranging from March to June.[1] However, since the COVID-19 pandemic[2] took the world by storm to become a global public health issue,[3] changes in epidemiology have been observed in pediatric emergency departments. Children have not been going to school and have spent most of their time at home, which may have decreased the spread of diseases[4] in general and affected the everyday reality of pediatric care.

Transmission of the coronavirus occurs from person to person via contact with infected mucosae, secretion or fomites.[5] In China, children aged ten years or younger account for less than 1% of the cases of the disease.[6] Different symptoms in connection with SARS-CoV-2 infection have been reported. In pediatrics, the literature has described mostly positive outcomes in cases of patients with multiple symptoms and asymptomatic subjects.[2,5] Factors pertaining to the host and exposure to the disease are at play.[4] It has been suggested that the key to diagnosis[3] might reside in epidemiology.[2] Therefore, epidemiological data related to COVID-19 are of great value.

METHODS

This observational retrospective descriptive study was based on analyses of the medical files and statistics of a general hospital. It included the charts of every patient seen at the pediatric emergency department in the months of March, April, and May 2019. The findings derived from these patient charts were compared to patient data from the same months of the year of 2020. The following International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) codes were contemplated: J21, J210, J218, J219, S06, S068, and S069.

The following variables were assessed: number of patients seen; hospitalization rate; and frequency of occurrence of the abovementioned conditions. In the presentation of the results, mention to the years of 2019 and 2020 should be construed as data collected only in the months of March, April, and May of each respective year. Data from other months of the year were not included. The data were processed on Microsoft Excel.

The frequencies of hospitalization in 2019 and 2020 were compared via the chi-squared test. Statistical significance was attributed to differences with $p < 0.05$. Our findings were correlated with findings published in current scientific literature. Data were not saved after the study.

RESULTS

In 2019, 1,658 visits were recorded in the pediatric emergency unit. March accounted for 33.7% of the total number of visits. April was the busiest month, with 43.8% of the visits. The number of visits dropped by 20% in May in relation to April. Acute bronchitis (J219) and acute bronchiolitis (J21) were the most commonly described conditions.

In 2020, a total of 502 visits were recorded in the pediatric emergency department, a drop of 70% in relation to 2019. March was by far the busiest month, with 83.2% of the visits. April accounted for 11.2% of the visits, while May had a meager 5.6%. Acute bronchitis was the most prevalent condition of the trimester.

A total of 537 and 215 patients were hospitalized in 2019 and 2020, respectively. Acute bronchitis was the most frequent cause of hospitalization in 2019 and 2020 (37% and 53% of all hospitalizations, respectively). In 2019, 38% of the visits to the pediatric emergency department were due to respiratory syncytial virus acute bronchiolitis; a sharp decrease was seen in 2020, and cases of the disease accounted for only 4% of all hospitalizations. In 2019, intracranial injury (S069) accounted for only 1.2% of all hospitalizations. In 2020, the number went up to 5%. Graphs 1 and 2 describe the recorded hospitalizations.

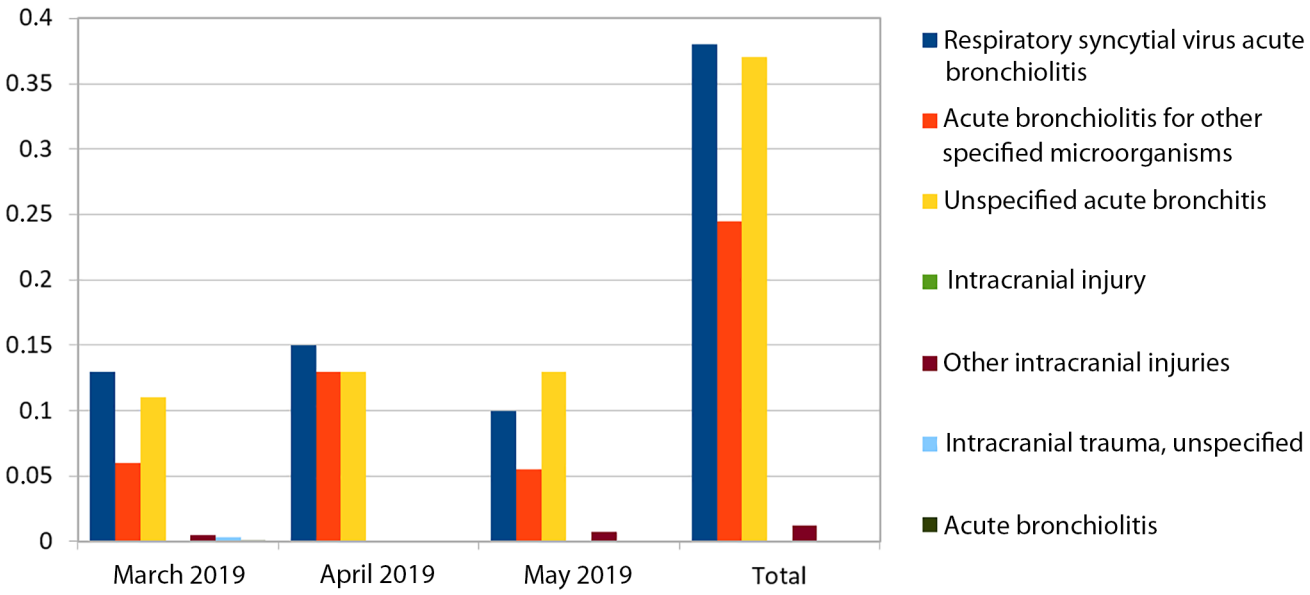
March accounted for 29% of all hospitalizations in 2019, April for 40% and May for 30%. In 2020, 85% of all hospitalizations in the trimester happened in March, followed by April with 10% and May with 4%. The chi-squared test was used to compare the frequencies of hospitalization in 2019 and 2020. In March and April 2019, there were significantly more hospitalizations for respiratory syncytial virus acute bronchiolitis than in the same months in 2020. (p=0.0566 in March; p=0.0585 in April). March 2020 recorded significantly more cases of hospitalization for acute bronchitis than March 2019 (p=0.0025). The increase in hospitalizations for head injury was not statistically significant. (p=0.1149; p=0.8522).

DISCUSSION

Prior to the pandemic, the three months analyzed in this study recorded most of the annual regional cases of pediatric respiratory disease.[1] In many countries, schools and daycares were closed with the start of the health crisis to mitigate the dissemination of SARS-CoV-2. In epidemiological terms, these measures led to decreases in the spread of the virus and generated fear of contamination in part of the population,[4,7] which strengthened personal hygiene practices. These factors led to the changes seen in emergency and urgent care. A clear decrease was observed in the number of patients seen in the pediatric emergency department in 2020. Decreases were also seen in the number of cases of respiratory syncytial virus acute bronchiolitis, potentially indicating the effectiveness of social isolation measures.[4] Many caretakers and parents have tolerated a great deal of severe symptoms at home to avoid going to a hospital. Based primarily on excessive fear, this practice may put the lives of children at risk and should be discouraged by pediatricians.

Table 1. Frequency of diseases by month; 2019 and 2020.

	Year	March	April	May	Total
Respiratory syncytial virus acute bronchiolitis	2019	4.5% (n=76)	7.6% (n=127)	6% (n=100)	18% (n=303)
	2020	21.1% (n=106)	4.7% (n=24)	0.3% (n=2)	26.3% (n=132)
Acute bronchiolitis for other specified microorganisms	2019	6.5% (n=108)	10.6% (n=176)	7.4% (n=123)	24.5% (n=407)
	2020	24.1% (n=121)	1.7% (n=9)	1.5% (n=8)	27.4% (n=138)
Unspecified acute bronchitis	2019	10.7% (n=179)	10.3% (n=172)	8.5% (n=141)	29.5% (n=492)
	2020	33.6% (n=169)	3.1% (n=16)	2.3% (n=12)	39.2% (n=197)
Acute bronchiolitis	2019	10.3% (n=172)	14.7% (n=245)	0% (n=0)	25% (n=417)
	2020	0% (n=0)	0% (n=0)	0% (n=0)	0% (n=0)
Other intracranial injuries	2019	0.3% (n=5)	0% (n=0)	0.3% (n=5)	0.6% (n=10)
	2020	1.3% (n=7)	1% (n=5)	0.1% (n=1)	2.6% (n=13)
Unspecified intracranial injury	2019	0.6% (n=11)	0.01% (n=3)	0.4% (n=7)	1.1% (n=21)
	2020	3% (n=15)	0.3% (n=2)	1% (n=5)	4.3% (n=22)
Intracranial injury	2019	0.4% (n=8)	0% (n=0)	0% (n=0)	0.4% (n=8)
	2020	0% (n=0)	0% (n=0)	0% (n=0)	0% (n=0)
Total	2019	33.7% (n=559)	43.6% (n=723)	22.6% (n=376)	100% (n=1658)
	2020	83.2% (n=418)	11.2% (n=56)	5.6% (n=28)	100% (n=502)

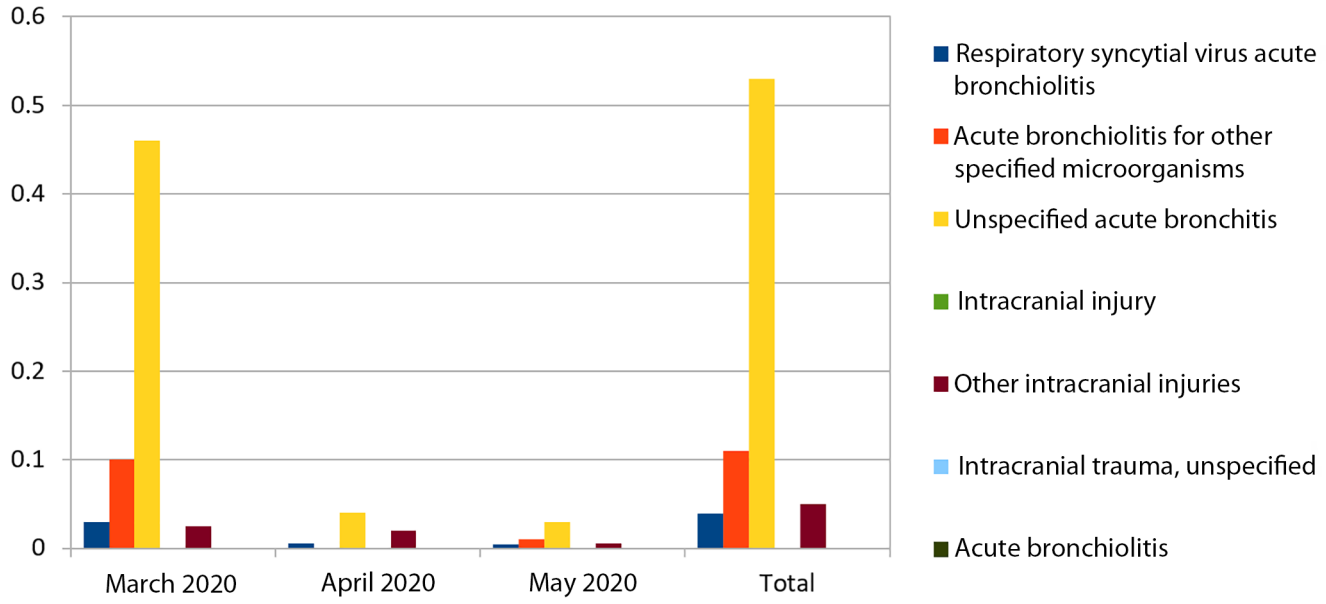


Graph 1. Hospitalizations by ICD-10 code in 2019.

In both years, hospitalizations were mostly linked to respiratory disease. The prevalence of respiratory conditions in the study population was expected, since March and June are known for high levels of circulation of certain viruses in the Brazilian Southeast.[1] Nevertheless, acute bronchitis was the top cause of hospitalization in 2020. Since this is a chronic disease characterized by flares, it may have other reasons to exacerbate in addition to infection, such as cold, pollution, aeroallergens, and food allergies, to name a few.[1,5]

April 2019 was the month with the greatest number of hospitalizations. In the context of the pediatric disease season, the same may have happened in previous years. However, after March 2020, as the pandemic grew in Brazil, hospitalizations in subsequent months declined abruptly, indicating that the predicted course of the pandemic was interrupted by the measures adopt to curb it, particularly by closing schools, daycares, and playgrounds.[3,4] The stigma associated with the disease may have contributed as well.

Since children have been spending much more time at home, we expected to see a significant increase in the number of cases of domestic accidents, trauma, and violence in 2020, particularly because many children have been left without



Graph 2. Hospitalizations by ICD-10 code in 2020.

the supervision of a parent or caretaker. Many parents and caretakers erroneously assumed that their homes were safe, and ended up overwhelmed in work and unable to properly supervise their children. The increase in intracranial injuries observed in this study might indicate that more domestic accidents have happened since the start of the pandemic. Despite the lack of statistical significance of this finding, further studies should look into the matter to potentially corroborate the hypothesis presented above.[2]

This study looked only into the more frequently used ICD-10 codes in the everyday operation of a pediatric emergency department. Hospitalizations appear to be directly linked to the number of visits; and the pandemic seems to be directly associated with the decrease in the number of visits recorded at the pediatric emergency unit. The impact of the pandemic cannot be measured yet. More epidemiological studies on the subject are thus warranted.

CONCLUSION

The COVID-19 pandemic appears to have affected pediatric epidemiology by decreasing the number of visits and hospitalizations. Further epidemiological studies are required to describe the actual impact the pandemic has had in the lives of pediatricians.

REFERENCES

1. Caballero MT, Polack FP, Stein RT. Viral bronchiolitis in young infants: new perspectives for management and treatment. J Pediatr (Rio J). 2017;93(Suppl 1):75-83.
2. Cai J, Xu J, Lin D, Yang Z, Qu Z, Zhang Y, et al. A case series of children with 2019 novel coronavirus infection: clinical and epidemiological. Clin Infect Dis. 2020 Fev;1:ciaa198.
3. Qiu H, Wu J, Hong L, Luo Y, Song Q, Chen D. Clinical and epidemiological features of 36 children with coronavirus disease 2019 (COVID-19) in Zhejiang, China: an observational cohort study. Lancet Infect Dis. 2020 Jun;20(6):689-96.
4. Dong Y, Mo X, Hu Y, Qi X, Jiang F, Jiang Z, et al. Epidemiological characteristics of 2143 pediatric patients with 2019 coronavirus disease in China. Pediatrics. 2020 Abr;58(4):712-3.
5. Cheng VCC, Lau SKP, Woo PCY, Yuen KY. Severe acute respiratory syndrome coronavirus as an agent of emerging and reemerging infection. Clin Microbiol Rev. 2007 Out;20(4):660-94.
6. Lu X, Zhang L, Du H, Zhang J, Li YY, Qu J, et al. SARS-CoV-2 infection in children. N Engl J Med. 2020 Abr;382(17):1663-5.
7. Houghton C, Meskell P, Delaney H, Smalle M, Glenton C, Booth A, et al. Barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines for respiratory infectious diseases: a rapid qualitative evidence synthesis. Cochrane Database Syst Rev. 2020;4(4):CD013582.