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Title

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Permalink

<https://escholarship.org/uc/item/5r87m7zw>

Journal

Mediterranean Journal of Emergency Medicine & Acute Care, 3(1)

ISSN

2642-7168

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Publication Date

2021-04-25

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COVID-19 & the Pied Piper Effect on Pediatric Emergency Department Attendances - A Single-Center Study Based in the UAE

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ABSTRACT

Introduction: The coronavirus 2019 (COVID 19) is an ongoing pandemic that brought significant changes in the healthcare sector, including healthcare-seeking behaviours, population movement, and daily activities. The COVID 19 has significantly affected the influx of pediatric patients attending the emergency department at a tertiary hospital level. This paper aims to measure and study the magnitude and reasons behind the reducing number of children attendances. COVID-19 compares with the disappearing number of children attending PED's to Pied Piper of Hamelin, attracting kids away from their homes as in our old bedtime stories.

Methods: Our paper is a single-centre, retrospective, observational study in the Pediatric Emergency Department (PED) and data obtained from Electronic Medical Records and ED Dashboard. We included all pediatric patients who registered in our PED during April, May, and June over three years (2018, 2019, and 2020), including their level of triage and rate of admissions.

Results: The total attendance and the number of admissions dropped dramatically in 2020 compared to the same period in 2018 and 2019. The number of attendances dropped from 10880 in 2018 and 11889 in 2019 to only 4621 in 2020. However, the percentages of category 1 and 2 patients increased in 2020 compared to the previous years.

Conclusion: In conclusion, the pandemic dramatically affected the PED visits by decreasing the number of patient attendances. In addition, it also reduced the access to several children in need of essential emergency department services.

Key words: emergency severity index, COVID-19, pediatric emergency department

INTRODUCTION

COVID-19 (SARS CoV-2) pandemic had various effects on emergency departments (ED) worldwide, notably the change in patient attendances' number and severity. Significant changes have also been in healthcare-seeking behaviours, population movement, and daily activities.¹ Some countries have reported a reduction in Pediatric Emergency Department (PED)

attendances. The extent of this reduction may point to the fact that multiple factors could play a role in influencing families' decision to attend the PED.²

Studies from the United Kingdom² and Italy³ reported up to 50% and 75% reduction in PED attendances. COVID-19 is comparable to the disappearing number of children attending PED's to Pied Piper of Hamelin, attracting kids away from their homes as in our old bedtime stories.

The first reported case of COVID-19 in the United Arab Emirates (UAE) was on the 29th of January 2020. The government implemented quarantine regulations from early March 2020, including suspending schools, prayers, and curfew applications. The UAE Government and Department of Health (DOH) applied mandatory measures such as wearing facemasks and

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quarantine for every confirmed case. The study aimed to look retrospectively at the PED attendances to Tawam Hospital in the second quarter (April, May, and June) of 3 consecutive years, 2018, 2019, and 2020 including assessing the severity of cases and admission rates to in-hospital wards.

MATERIALS & METHODS

Study Design and Setting

Our study is observational, single-center, retrospective, in nature, and conducted in Tawam Hospital PED. Our approximate annual PED attendances during non-covid times were 45,000 children. The DOH designated our hospital as a COVID-19 free entity, and our sister hospital became the designated COVID-19 hospital. Therefore, our PED became the sole government pediatric tertiary emergency care provider. We obtained ethical approval from the hospital ethics committee and the DOH (DOH/CVDC/2020/2418).

Inclusion and Exclusion Criteria

All children registered in our PED aged less than 16 years during April, May, and June of 2018, 2019, and 2020 were included in the study. There were no exclusion criteria.

Data Collection

We collected data from electronic medical records (triage level and admission rates) and ED Dashboard (attendances) for analysis. We use an Emergency Severity Index (ESI), a five-level emergency department (ED) triage algorithm to stratify patients into five categories from 1 (most urgent) to 5 (least urgent) based on the acuity and resource needs.

Statistical Analysis

We used Microsoft Excel for data processing, figures, and tables, and SPSS 20 for statistical analysis. We used Chi-square calculation to extract p-value to determine if there was a significant decrease in the number of attendances to the PED during 2020 compared to 2018 and 2019. Significance was determined at $p < 0.05$.

RESULTS

Attendances to our PED dropped dramatically in 2020 (4621 children) in comparison to the same period in 2018 (10880 children) and 2019 (11889 children), as shown in Figure 1. Admission rates also differed in the studied period, from 1018 admissions (9.4%) in 2018 to 1251 (10.5%) in 2019. Whereas in 2020, there were 619 (13.4%) admissions.

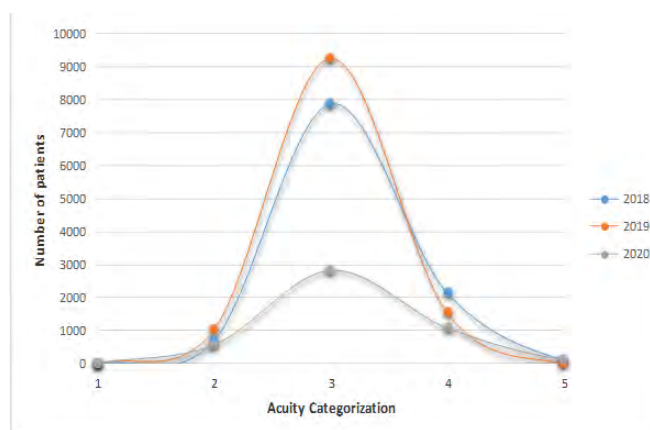


Figure 1 3-year second quarter % acuity of cases according to Emergency Severity Index triage system

The differences in presentations were statistically significant across the three years. P-value was $< .00001$ for the total presentations of all categories, $< .0003$ for categories 1 and 2, and $< .00001$ for categories 4 and 5.

The percentage of category 1 cases increased in 2020 to 0.4% compared to 0.1% in 2018 and 2019. Category 2 cases also increased from 6.8% and 8.8% in 2018 and 2019 to 12.2% in 2020. However, there was a decrease in category 3 cases to 61% in 2020 compared to 72.5% and 77.9% in 2018 and 2019 (Table 1).

Table 1 3-year second quarter % acuity of cases according to Emergency Severity Index triage system

Category Level	2018	2019	2020
1	0.1%	0.1%	0.4%
2	6.5%	8.8%	12.2%
3	72.5%	77.9%	61.5%
4	19.8%	13.1%	23.5%
5	1.1%	0.1%	2.4%

DISCUSSION

In general, there was more than 50% reduction in total presentations to our PED in 2020, compared to the preceding two years. However, a slight increase in categories 1 and 2 might explain that parents avoided coming to the emergency department unless necessary. On the other hand, the percentage of children categorized as 4 and 5 acuity levels slightly increased in 2020 or remained within the same range as in the previous years.

Multiple factors could explain the trend of not attending the emergency department amidst the COVID-19 pandemic. Our doctors and nursing staff asked many families (informal survey) why the delayed attendance to the PED, where an earlier attendance would have been preferable. Principally parents avoided hospitals due to concerns about contracting the COVID-19 virus. The effects of increased social awareness and media may have played a role.⁵

We speculate that parents working from home enabled more extended periods of supervision of children, which could explain the decreased attendances of mild to moderate traumatic injuries. A similar hypothesis is presented in the literature as the main reason for reducing trauma presentations.^{6,7}

Given that the most common causes of PED visits are infections, it is postulated that virtual schooling, along with increased use of hand hygiene and facemasks, possibly resulted in a decreased rate of bacterial and viral infections, thus limiting the ED's need.⁸ Furthermore, physical distancing measures such as city curfew and the closure of malls/places of worship, restricted people's movement, reducing the chance of contracting COVID-19 and non-COVID infections.

However, children with chronic conditions and acute illness must attend the ED. Therefore, both families and healthcare workers need clear guidance and information. Studies have shown a reduction or delay in pediatric vaccinations.⁹ Families should be aware that delaying access to the hospital in several emergency conditions could be more detrimental to their children than contracting the COVID-19 virus.¹⁰

A main limitation of the present study is the fact that it was a single-center study and did not include data

from several private hospitals functioning during the study period. Another limitation is that the study was conducted during spring and summer rather than in winter when respiratory viruses are more prevalent.

CONCLUSION

In conclusion, the pandemic dramatically affected the PED visits by decreasing the number of patient attendances. In addition, it also reduced the access to several children in need of essential emergency department services. Hence, detailed nationwide awareness programs should be in place to guide the population about the importance of presenting to ED in specific circumstances when the benefits outweigh the risks of contracting COVID-19 infection.

Conflicts of Interest: The author declare no conflicts of interest or sources of funding.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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