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COVID-19 impact on the emergency and hospitalization of a tertiary hospital. Management lessons learned[☆]



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ABSTRACT

Introduction: The objective is to analyze the impact of the COVID-19 pandemic on the pediatric emergencies and hospital admissions.

Methods: Retrospective cohort study of patients treated in a tertiary hospital, from March 14 to April 26, 2020, compared to the same period of the previous 3 years.

Results: A notable overall reduction in emergency room visits and admissions is observed in all pediatric areas, maintaining care in neonatology and scheduled admissions in oncology.

Discussion: The reduction in global activity in pediatric emergencies is not only explained by the decrease in contagious diseases. The decrease in inadequate demand and inappropriate income may have contributed. The availability of pediatric beds would make the reduction of programmed surgical activity unnecessary and would allow the redistribution of resources to areas with greater healthcare pressure.

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Impacto COVID-19 en la urgencia y hospitalización de un hospital terciario. Lecciones de gestión aprendidas

RESUMEN

Introducción: El objetivo es analizar el impacto de la pandemia COVID-19 en las urgencias e ingresos hospitalarios pediátricos.

Métodos: Estudio de cohortes retrospectivo, de los pacientes atendidos en un hospital terciario, desde el 14 de marzo hasta el 26 de abril de 2020 comparándose con el mismo periodo de los 3 años anteriores.

Resultados: Se observa una notable reducción global de las visitas a urgencias e ingresos en todas las áreas pediátricas, manteniéndose la asistencia en neonatología y los ingresos programados en oncología.

Discusión: La reducción de la actividad global en la urgencia pediátrica no es solo explicable por la disminución de las enfermedades transmisibles. Ha podido contribuir la disminución de la demanda inadecuada y de los ingresos inapropiados. La disponibilidad de camas pediátricas haría innecesaria la reducción de la actividad quirúrgica programada y permitiría redistribuir recursos a áreas con mayor presión asistencial.

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Palabras clave:

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Introduction

On 14 March 2020, the Government of Spain declared the COVID-19 pandemic and the state of alarm and lockdown of the general population. As of 26 April, the child population was allowed to go out for one hour, beginning the de-escalation process. This period of lockdown presented the opportunity for us to observe how regular childhood diseases behave under circumstances of

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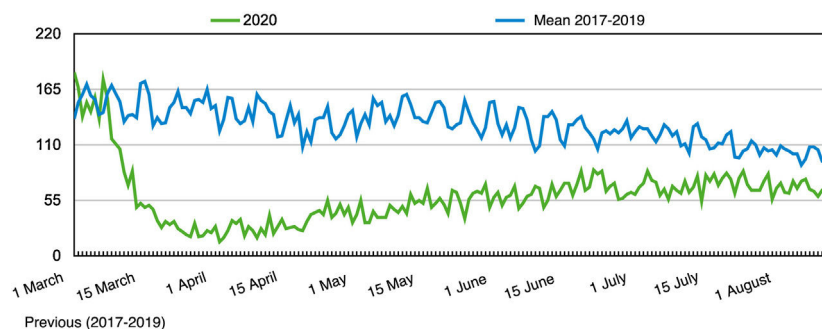


Fig. 1. Comparison of the evolution of paediatric accident and emergency episodes during the period March–August 2020 compared to the previous years (2017–2019).

population isolation, and its impact on accident and emergency departments and hospitalisation. These lessons learned from an exceptional situation can be used for future resource management under similar circumstances.

The objective of the study was to analyse the impact of lockdown and social distancing measures during the pandemic on the volume of paediatric hospital admissions and emergencies, with the working hypothesis that it is significantly reduced.

Methods

This was a retrospective cohort study of the volume of patients seen in the accident and emergency department and paediatric hospitalisation in a tertiary care hospital.

The daily incidence of paediatric emergencies was graphically analysed compared with the mean of the three previous years, from 1 March to 31 August, through the hospital information automatic analysis program (CUIDISS).

The patients treated by the paediatric accident and emergency department and the percentage of emergency admissions were analysed. A sub-analysis of the emergencies was performed according to their stratification into two subgroups by assessment in the triage system (Paediatric Manchester triage system), group 1 (non-urgent and standard) and group 2 (urgent, very urgent and immediate).

Urgent and scheduled hospital admissions in different departments were analysed: general paediatrics, neonatology, paediatric

intensive care unit (PICU), paediatric oncology, paediatric trauma and paediatric surgery.

The period analysed was 14 March to 26 April, 2020 (CoV) and was compared with the mean of the same period in the previous three years (pre-CoV).

During these periods, there was no redistribution of paediatric care in the different health departments of the province.

The results are expressed in total patients or percentages, comparing the values of the year 2020 with the mean and 95% confidence interval of the previous three years. A significant difference is considered with $p < 0.05$ when the 2020 value is outside the confidence interval.

The study was approved by the hospital's independent ethics committee for research with medicinal products under registration number 2021-020-1.

Results

Fig. 1 shows a sharp decrease (58%) in comparative emergencies between one week before and one week after the start of lockdown, which was maintained throughout the period until the end of lockdown before rising progressively in the different phases of de-escalation, without yet reaching the values of years prior to 31 August 2020.

Table 1 shows the annual differences during the period compared. A 76% overall reduction in visits to the accident and emergency department and a 42% reduction in the total number

Table 1

Comparison of paediatric accident and emergency episodes and hospital admissions during the period 14 March–26 April 2020 compared to the previous years (2017–2019).

	Mean (2017–2019)	95% confidence interval (2017–2019)	2020 data	p-value
<i>Episodes</i>	6297	(5347–7227)	1485	<0.05
<i>Admissions</i>	403	(295–511)	233	<0.05
<i>Percentage of admissions</i>	6.3%	5.8–6.8	15%	<0.05
<i>Triage</i>				
Non-urgent and standard	81%	80.2–81.8	7%	<0.05
Urgent, very urgent or immediate	19%	16.2–21.8	25%	<0.05
<i>General paediatrics</i>				
Emergency admissions	399	(325–473)	281	<0.05
Scheduled admissions	159	(111–207)	98	<0.05
<i>Paediatric surgery</i>				
Emergency admissions	71	(43–142)	37	<0.05
Scheduled admissions	77	(67–87)	6	<0.05
<i>Paediatric traumatology</i>				
Emergency admissions	38	(18–58)	9	<0.05
Scheduled admissions	49	(29–69)	7	<0.05
<i>Paediatric oncology</i>				
Emergency admissions	38	(24–52)	21	<0.05
Scheduled admissions	74	(22–126)	60	Not significant
<i>Neonatology</i>				
Total admissions	113	(110–117)	129	<0.05
<i>Paediatric intensive care unit</i>				
Admissions	117	(97–137)	35	<0.05
Occupancy rate (%)	52.7%	(47.7–56.2)	27.3%	<0.05

of emergency admissions are striking findings. The relative percentage of admissions compared to A&E was higher in 2020 (15% vs 6%). The differences in care in both triage assessment subgroups are shown, with the percentage in group two being significantly higher during the year 2020.

In the analysis by paediatric departments, there was a statistically significant reduction in emergency admissions for general paediatrics, surgery, traumatology, oncology and PICU. There was no reduction in neonatology admissions. A reduction was seen in all areas of scheduled admissions, although it was not significant in oncology.

During the study period, only 15 SARS-CoV-2 PCR-positive patients with mild symptoms or symptoms unrelated to COVID-19 were admitted.

Discussion

The sharp drop of 58% between the week before and the week after the start of lockdown is not solely explained by the decrease in communicable diseases, especially of a respiratory nature, taking into account their incubation period. However, this fact could explain the persistent low demand in subsequent weeks, as has happened in the southern hemisphere winter with the flu.¹ In one study,² admissions by disease groups between 2020 and the mean of the previous four years were compared, with a significant reduction for diseases related to social distancing (asthma, bronchiolitis and pneumonia), without observing changes with unrelated diseases (urinary tract infection, gastroesophageal reflux and cellulitis). Other factors described may have contributed, such as a decrease in excessive demand in hospital accident and emergency departments, reported to be 43% in some studies,³ either due to fear of infection or due to greater management of minor disease at home. A reduction in inappropriate admissions, estimated at 17.7% in a previous study,⁴ could also have contributed to the decrease in the total number of emergency admissions (42%). Our results regarding the relative increase of cases classified in triage as urgent compared to non-urgent cases in the year 2020, as well as the relative increase in the percentage of admissions compared to the total number seen by A&E, would support these hypotheses. In a similar study conducted in a tertiary care hospital⁵ that compared the gross annual rate of visits to the accident and emergency department and admissions in the year 2020 (CoV) with the average of the previous four years (pre-CoV), A&E visits fell by 83% and admissions by 64%. The same study found a percentage of mild level triage similar to ours (74.4%) in 2020, although it was not compared to the pre-CoV period, which in our case was 81%. The rate of visits to the accident and emergency department that required admission in that study increased from 6% to 11% in 2020, which is similar to the findings of our study. In a comparative study between 2019 and 2020 carried out in another tertiary care hospital,⁶ the total number of visits to A&E fell by 68% and the total number of admissions by 33.3%, by 48% for lung disease, and the rate of admissions compared to the total number of A&E visits increased from 5.1% to 10.9% in 2020. In a secondary care hospital,⁷ a 64% decrease in visits to the accident and emergency department was also observed.

Regarding the surgical areas, the decrease in emergency trauma admissions could be explained by the reduction in mobility due to lockdown. It is more difficult to explain the reduction in emergency admissions for paediatric surgery. In one study at a tertiary care hospital,⁸ although there was a 55.2% decrease in emergency surgeries, particularly uncomplicated acute appendicitis, complicated appendicitis increased by 66%. In the same study, the reduction in polytrauma was 100% compared to the same period in 2019. In a study conducted in Palma de Mallorca,⁵ trauma emergencies decreased by 85% while surgery fell by 50%.

A study similar to ours in a tertiary care hospital in Philadelphia, which assessed the 30 days following the start of lockdown compared to the previous three years, shows significant results in terms of a decrease in the volume of daily visits to the accident and emergency department, admissions to the ward and PICU; and a relative increase in the percentage of urgent cases according to triage, as well as ward and PICU admissions, especially regarding trauma, fever and abdominal pain.⁹

The reduction in scheduled surgical activity in both traumatology (86%) and surgery (92%) is similar to that reported in the Hospital de Sabadell [Sabadell Hospital] study (98%)⁸ and follows a management decision in anticipation of a higher occupancy of beds due to COVID-19-related illness, as well as a greater availability of human resources. The reduction in admissions to the PICU, as well as the average length of stay, a finding also reported in the Pamplona study,⁶ can in part be explained by the decrease in surgical activity, as well as the low incidence of serious disease caused by SARS-CoV-2. The lack of changes in care in the neonatal area is explained by its independence from the isolation measures. We have not found comparative data on care in the paediatric oncology area, although the reduction in emergency admissions could be explained by the decrease in intercurrent respiratory infections and the lack of changes in scheduled admissions due to the fact that they could not be delayed.

In conclusion, the results show that general lockdown significantly reduces accident and emergency visits and hospital admissions, with a similar pattern seen in other hospitals. This fact, added to the peculiarities of the COVID-19 infection in childhood with scarce involvement and severity,¹⁰ paradoxically results in an increase in the availability of paediatric beds during the peaks of the pandemic and the opportunity not to reduce scheduled surgical activity as was done in this first wave, as well as to redistribute material and human resources to areas with greater healthcare pressure.

It would be interesting to investigate whether hygiene measures, the use of a mask and social distancing, without lockdown or school closures, would produce similar effects during the annual epidemic period of bronchiolitis and influenza.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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