

SCIENTIFIC LETTERS

Pediatric patients with suspected COVID-19 in an emergency department: analysis of characteristics and transmission to contacts*Análisis de los pacientes menores de edad con sospecha de covid-19 en un servicio de urgencias y su impacto en el estudio de contactos*

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The incidence of COVID-19 cases in Spain during the first months of the pandemic was higher in adults than in children, probably because the characteristics of the disease appear to be different in childhood¹. In general, infected children are more likely to be asymptomatic and hospitalization for severe forms is infrequent². Epidemiological data to date suggest that children are less likely to become infected than adults following exposure to a case, mainly those under 10 years of age^{3,4} and it is generally adults caring for children who are at greatest risk of infection and transmission⁵. The closure of schools as a preventive measure to try to reduce viral transmission through children led to consequences at the educational level, labor and family reconciliation problems and an increased risk of social exclusion⁶.

Knowledge of the situation at the population level in the pediatric age group can help in planning health care and resource management. The aim of this study was to assess the characteristics and potential risk of transmission in pediatric patients with suspected COVID-19 seen in the emergency department (ED) of the Hospital General Universitario de Ciudad Real (HGUCR), analyzing its impact on this department.

An observational study was conducted in a prospective cohort of pediatric patients under 18 years of age seen in the HGUCR ED. The study period was from August 25 to September 30, 2020. The cases to be included in the study had to meet: 1) clinical criteria: at least 1 of the 2 criteria defining clinical suspicion of COVID-19 in line with the Ministry of Health Guide updated to the same date⁷, and 2) epidemiological criteria: performance of reverse transcriptase polymerase chain reaction (RT-PCR) test for clinical suspicion of COVID-19 taken by swab of nasopharyngeal exudate.

Baseline and clinical variables were collected. Public Health contacted parents or guardians at 1 week and 15 days to assess the evolution of the children, using

the modified questionnaire published by the Infectious Pathology Group of the Spanish Association of Primary Care Pediatrics⁸. The Epidemiological Surveillance Nursing Network (EVE) performed the contact study and reported on the preventive measures to be considered. The infection rate was defined as the proportion of those exposed who developed the disease among the total number of those exposed.

For the descriptive analysis, the mean and standard deviation (SD) were used to define the quantitative variables. A prior analysis of normality (Shapiro-Wilk and Kolmogorov-Smirnov) was applied, and based on goodness of fit, Student t-tests or Mann-Whitney U tests were used. Qualitative variables were expressed as counts and percentages and the chi-squared test was used. Significance was considered to exist if $P < .05$. Statistical analyses were performed with the SPSS program (version 24.0 Windows, IBM, US). This study was promoted by the Public Health area of the Counseling of

Castilla-La Mancha, was approved by the Research Ethics Committee of the HGUCR (C-376 v.1) and followed the recommendations of the 'Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) initiative.

In the ED, 1178 patients under 18 years of age were seen during this period. A total of 884 PCRs for SARS-CoV-2 were performed in this group. Only 310 patients met the clinical criteria for suspicion of COVID-19; in the remaining cases ($n = 574$) it was performed prior to a surgical procedure or special tests ($n = 119$) or because of a history of contact ($n = 455$). Table 1 shows the characteristics of the pediatric patients seen in the HGUCR ED during the study period with clinical suspicion of COVID-19.

Only 10% were PCR positive. Patients with positive PCR ($n = 31$)

Table 1. Characteristics of pediatric patients with clinical suspicion of COVID-19 seen in the HGUCR ED

| | Total N = 310 n (%) | Negative PCR N = 279 n (%) | Positive PCR N = 31 n (%) | P |
|--|---------------------------|----------------------------------|---------------------------------|------------------|
| Age (years) | | | | .010 |
| < 6 | 170 (54.8) | 158 (56.6) | 12 (38.7) | |
| 6-10 | 49 (15.8) | 47 (16.8) | 2 (6.5) | |
| 11-14 | 35 (11.3) | 29 (10.4) | 6 (19.4) | |
| 15-18 | 56 (18.1) | 45 (16.1) | 11 (35.5) | |
| Sex, female | 144 (46.5) | 130 (46.6) | 14 (45.2) | .879 |
| Days with clinical manifestations [mean (SD)] | 1.91 (1.8) | 1.75 (1.57) | 3.47 (2.8) | < .001 |
| Background | | | | |
| Pulmonary disease | 31 (10) | 29 (10.4) | 2 (6.5) | .488 |
| Neurological | 14 (4.5) | 13 (4.7) | 1 (3.2) | .715 |
| Reason for consultation | | | | |
| Headache | 30 (9.7) | 23 (8.2) | 7 (22.6) | .010 |
| Fever | 216 (69.7) | 197 (70.6) | 19 (61.3) | .284 |
| Cough | 78 (25.2) | 76 (27.2) | 2 (6.5) | .011 |
| Rhinorrhea | 74 (23.9) | 71 (25.4) | 3 (9.7) | .051 |
| Vomiting or diarrhea | 94 (30.3) | 92 (33.0) | 2 (6.5) | .002 |
| Urticaria | 8 (2.6) | 8 (2.9) | 0 (0.0) | .852 |
| Ageusia or anosmia | 6 (1.9) | 3 (1.1) | 3 (9.7) | .001 |
| Familial infection | 45 (14.5) | 40 (14.3) | 5 (16.1) | .788 |
| Other causes | 2 (0.6) | 0 (0.0) | 2 (6.5) | .010 |

SD: standard deviation; HGUCR: Hospital General Universitario de Ciudad Real; PCR: polymerase chain reaction; ED: hospital emergency department.

Bold p values denote statistical significance ($P < .05$).

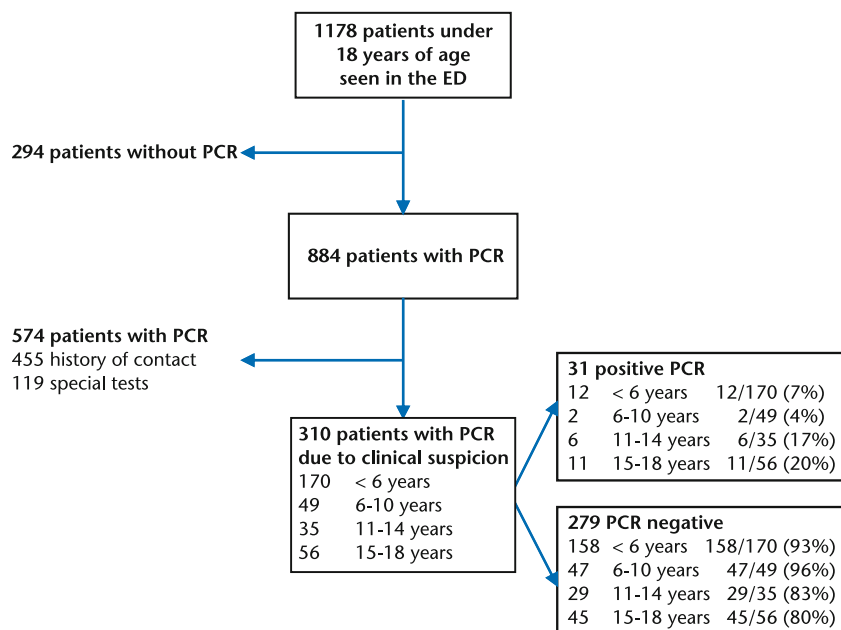


Figure 1. Flow diagram of the study.

ED: hospital emergency department; PCR: polymerase chain reaction.

were compared with patients with negative PCR ($n = 279$). Patients older than 10 years and clinically suspicious were positive in 35.5% of cases. When categorized by age range, the frequency of positives increased significantly with increasing age ($P = .010$), reaching 20% in patients aged 15-18 years (Figure 1), as has been reported by other authors⁹. The mean number of clinical days of the patients was higher in the case of positive patients [3.47 (SD 2.8) days] than in negative patients [1.75 (SD 1.57) days], $P < .001$. Headache ($P = .010$), anosmia ($P = .001$) and other causes ($P = .010$) were more frequent in positive patients, while cough ($P = .011$) and vomiting or diarrhea ($P = .002$) were more frequent in negative patients. This clinical picture observed in our sample was similar to that published in other series¹⁰.

Only 3 cases had a history of risk (2 with occasional episodic asthma and 1 with febrile convulsions) and only 1 patient required admission, without requiring intensive care measures. This coincides with that published by Göttinger et al. in cases of SARS-CoV-2 infection in children¹¹.

Table 2 shows the evolution and epidemiological surveillance of positive patients. Parents or guardians reported that 61% of the patients were more depressed, with no feeding difficulties (64.5%), no sleep disturbances (58.1%) and no progressive res-

piratory distress (80.6%). The literature describes that the involvement in children is usually milder and they do not usually present progressive respiratory worsening, as in adults¹².

The overall infection rate in living contacts was 20%, without significantly affecting non-living close contacts (16%), and without being able to establish the pediatric case as an index case. Heavey et al. in Ireland¹³ and Park et al. in South Korea¹⁴ report that children under 10 years of age do not seem to contribute significantly to SARS-CoV-2 transmission, even more so when measures such as hand washing, use of hydroalcoholic gel, chewing gels and social distancing have been initiated. We did not observe an increase in ED demand in the study period with respect to the first quarter of the year. As other authors have suggested¹⁵, if the rate of community transmission is low, the closure of schools would have little impact on reducing the transmission of SARS-CoV-2 in this group of patients, but would nevertheless entail a high social and educational cost for this population.

As a limitation, we should point out that through the EVE network we knew the number of contacts of the children with positive clinical and PCR findings, but we were unable to establish with certainty the index case within the coexistence group and whether the child was the secondary

Table 2. Evolution and epidemiological surveillance of pediatric patients with positive PCR

| | Patients N = 31 n (%) |
|---|-----------------------------|
| Evolution | |
| General condition | |
| Habitual | 10/31 (32.3) |
| Irritable | 2/31 (6.5) |
| Declined | 19/31 (61.3) |
| Feeding | |
| Bad | 8/31 (25.8) |
| Regular | 3/31 (9.7) |
| Normal | 20/31 (64.5) |
| Vomiting | 3/31 (9.7) |
| Diarrhea | 5/31 (16.1) |
| Sleep | |
| Bad | 6/31 (19.4) |
| As usual | 18/31 (58.1) |
| Sleepy tendency | 7/31 (22.6) |
| Breathing difficulty | |
| Breathing faster | 3/31 (9.7) |
| Breathing normal | 25/31 (80.6) |
| Subcostal tightness | 3/31 (9.7) |
| Cough | |
| No cough | 10/31 (32.3) |
| Increasing | 3/31 (9.7) |
| Decreasing | 14/31 (45.2) |
| Same | 4/31 (12.9) |
| Skin lesions | |
| No lesions | 23/31 (74.2) |
| Yes, wheals | 4/31 (12.9) |
| Yes, nonspecific rash | 4/31 (12.9) |
| Epidemiological surveillance [Mean (SD)] | |
| Total contacts | 7.8 (5.1) |
| Positive contacts | 2.0 (1.8) |
| Total contacts | 3.5 (1.8) |
| Positive cohabitants | 1.6 (1.3) |
| Non-cohabitant positive | 0.4 (0.2) |

SD: standard deviation; PCR: polymerase chain reaction.

case, either by causality or temporality criteria³. As this study was limited to the ED of a single center, the data cannot be extrapolated to the entire health area, but it did allow us to explore the impact on an ED that serves a pediatric population of 37,000 inhabitants.

We can conclude that the rate of COVID-19 infection in under-aged patients attending the ED of our center was 10%, and these cases presented a favorable evolution in the follow-up.

Addendum

COVID-19 HGUCR Network: Pilar López-Juárez, Raquel Bodoque-Villar, Miguel Ángel García-Cabezas, María José Ballester-Herrera, María Arántzazu González-Marín, Marta Torres-Narbona, José Martínez-Alarcón, Javier Fernández-Pinilla, Rubén José Bernal-Celestino.

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Conflict of Interest Disclosures: None reported.

Author Contributions, Funding/Support, and Ethical responsibilities: All authors have confirmed their authorship, the absence of external funding, and the maintenance of confidentiality and respect for patients' rights in the author's responsibilities document, publication agreement, and assignment of rights to EMERGENCIAS. This study was promoted by the Public Health Department of the Regional Ministry of Castilla-La Mancha and approved by the HGUCR Drug Research Ethics Committee (C-376 v.1).

Acknowledgments: Thanks to the Public Health Department of the health counseling of Castilla-La Mancha, the epidemiological surveillance nursing team, the Microbiology Service, the Pediatrics Service of the HGUCR, and the children and their families for their participation in this project.

Article not commissioned by the Editorial Committee and with external peer review.

Editor in charge: Agustín Julián-Jiménez.

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