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ACTA PÆDIATRICA NURTURING THE CHILD WILEY

BRIEF REPORT

COVID-19 study found that 0.4% of 5730 asymptomatic children aged 0–18 years tested positive for virus before hospital procedures or admission

This German study provides an overview of the prevalence of the severe acute respiratory coronavirus 2 (SARS-CoV-2) in asymptomatic children aged 0–18 years from 13 March to 13 December 2020. National data published at the end of the study period showed that 14.1% of German citizens who had tested positive for SARS-CoV-2 were under the age of 19 years.[1] However, less is known about how contagious asymptomatic children are.

The data, which were collected by the Faculty of Medicine and University Hospital Cologne, comprised 5730 real-time reverse transcriptase polymerase chain reaction (PCR) results, including 2315 PCR tests from children with an underlying chronic disease.

We analysed the PCR results of all children who received an elective SARS-CoV-2 PCR during the 9-month study period, to rule out infections before further in-house diagnostics or hospital admission. All the nasopharyngeal or oropharyngeal swabs were performed by trained staff. We excluded patients who were categorised as suspected cases according to national guidelines. These were those with symptoms that suggested COVID-19 and those who had been in contact with somebody who had recently tested positive for the virus.

The following data were retrospectively collected: gender, age, reason for presentation, potential symptoms, potential virus contacts and the cycle threshold value if the PCR was positive for SARS-CoV-2. A patient with a high cycle threshold has a low concentration of viral genetic material and this is typically associated with a lower risk of infectivity.

We also collected information on any potential risk groups, namely patients with any chronic diseases, including cardiac, oncological, pulmonary or renal diseases.

Numerical variables were presented using means and standard deviations or medians and ranges if the sample was not normally distributed. We checked for normal distribution by using the Kolmogorov-Smirnov test. Categorical variables are presented using percentages. The statistical analysis was performed using the Student *t*-test for normally distributed values, the Mann-Whitney *U*-test for non-normally distributed values or the chi-square test for categorical values. The results were analysed with Excel, Microsoft Office Professional Plus 2016 (Microsoft Corp), and statistical significance was set at $p < 0.05$.

There were 22/5730 (0.4%) positive PCR tests. The median age of positive patients was 12.0 (range 0.8–17.4) years compared to 5.2 (0–17.9) years for the patients who tested negative ($p = 0.001$). The median cycle threshold value of the positive PCR tests was 30.9 (range 20.1–35.7). Of the patients who tested positive, 10/22 (45.5%) had an underlying chronic disease. The cycle threshold values were similar among patients in different age groups ($p = 0.67$) and among patients with or without underlying comorbidities (median 29.3, range 20.1–35.7 versus median 31.6, 26.4–35.4; $p = 0.26$) (Table 1).

The continuous and rapid worldwide spread of SARS-CoV-2 and the lack of data on paediatric patients, especially the possible underreporting of asymptomatic infections, are of great concern. We need effective infection control strategies to protect healthcare workers and patients from nosocomial SARS-CoV-2 infections. Our data demonstrate a low number of unexpected positive tests (0.4%) in asymptomatic patients.

A French study hypothesised that a significant number of children admitted to hospital would not be detected by symptom-based testing strategies. It reported that 1.1% of 446 hospitalised paediatric patients who had a SARS-CoV-2 PCR, using a nasopharyngeal swab before admission, tested positive.[2] Despite the fairly low numbers of previously unrecorded positive cases in that cohort, and in ours, both reports emphasise the importance of a SARS-CoV-2 screening strategy that is not just based on clinical presentation. This is of particular importance when you consider the high number of contacts with other patients and healthcare workers that a single paediatric patient has during a hospital stay. This study cannot provide data on the potential reduction of nosocomial transmission due to the presented testing strategy. A reduction of transmission risk seems apparent, but other measures like face masks, social distancing and cohorting may have a comparable effect.

There have been controversial discussions about whether younger children are more infectious than older children. Heald-Sargent et al[3] reported that symptomatic children under the age of five had significantly lower cycle threshold values than children between 5 and 17 years of age ($p = 0.02$). On the other hand, virologists from the Charité University Hospital in Berlin, Germany, analysed 3712

TABLE 1 Demographics of patients who tested positive and negative for SARS-CoV-2

	Positive PCR tests (*n* = 22)	Negative PCR tests (*n* = 5708)
Age, median (range)	12.0 years (0.8–17.4)	5.2 years (0–17.9)
Male, *n* (%)	15 (68.7%)	3054 (53.5%)
Median cycle threshold, Value (range)	30.9 (20.1–35.7)	
Value <30.0	9 (40.9%)	
Value >30.0	13 (59.1%)	
Total chronic disease, *n* (%)	10 (45.5%)	2305 (40.4%)
Chronic cardiac disease, *n* (%)	5 (50.0%)	1310 (56.8%)
Chronic oncological disease, *n* (%)	5 (50.0%)	572 (24.8%)
Any other chronic disease, *n* (%)	0 (0%)	423 (18.4%)

COVID-19 patients and found no difference in the PCR threshold cycle values between the age groups, including children.[4] We did not find any differences between the age groups in our study either ($p = 0.67$).

Poline et al observed that patients with underlying medical conditions were no more likely to be infected than children without an underlying chronic disease (9/209, 4.3% vs. 13/229, 5.7%).[4] Our data support these findings with regard to asymptomatic patients, as there was a comparable distribution between the positive tests of patients with and without a chronic disease (10/2315, 0.4% vs. 12/3415, 0.4%; $p = 1.0$). On the other hand, chronically ill patients and their families tend to have established prevention measures as part of their daily life and are often more isolated and potentially better protected from being infected with SARS-CoV-2.

Since social distancing is hard to implement when caring for paediatric inpatients, the combination of PCR testing and face masks provides the potential to reduce the risk of SARS-CoV-2 infections in the sensitive environment of a children's hospital.

CONFLICT OF INTEREST

None.

Meike Meyer[1]
Esra Ruebsteck[1]
Henning Gruell[2]
Florian Klein[2]
Clara Lehmann[3]
Stefanie Wendt[4]
Christoph Huenseler[1]
Lutz Thorsten Weber[1]

[1]*Department of Pediatrics, Faculty of Medicine and University Hospital Cologne, University Hospital of Cologne, Cologne, Germany*
[2]*Faculty of Medicine and University Hospital Cologne, Institute of Virology, University Hospital of Cologne, Cologne, Germany*
[3]*Department of Internal Medicine, Faculty of Medicine and University Hospital Cologne, University Hospital of Cologne, Cologne, Germany*
[4]*Department of Cardiothoracic Surgery, Faculty of Medicine and University Hospital Cologne, University Hospital of Cologne, Cologne, Germany*

Correspondence
Meike Meyer, Department of Pediatrics, Faculty of Medicine and University Hospital Cologne, University of Cologne, Kerpener Str. 62, Cologne 50937, Germany.
Email: meike.meyer@uk-koeln.de

Christoph Huenseler and Lutz Thorsten Weber contributed equally to this paper as co-senior authors.

ORCID

Meike Meyer https://orcid.org/0000-0002-5708-3981
Henning Gruell https://orcid.org/0000-0002-0725-7138

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