COVID-19 in the Pediatric Population Admitted to a Tertiary Referral Hospital in Northern Italy: Preliminary Clinical Data

To the Editors:

At the end of December 2019, the coronavirus disease 2019 (COVID-19) epidemic started in China and then expanded worldwide. Thereafter, many clinical studies have been reported, but most of them concerned the Chinese people. Clinical data regarding the Italian pediatric population are still lacking.

In February 2020, the COVID-19 pandemic flared up across Italy, the first cluster started in South-Lombardy, which is still the most affected area.[1] COVID-19 caused about 19,000 deaths, including more than 110 doctors, so far (April 11).

Based on this background, we analyzed the data concerning all pediatric patients with COVID-19 (0–18 years old) admitted to the San Matteo Hospital of Pavia until April 4. The Province of Pavia (about 550,000 residents) belongs to Lombardy Region and is the catchment-area of this hub hospital. Patients were stratified in 4 subgroups according to the severity of the disease, classified as requiring home isolation, admission to low-intensity care, sub-intensive care unit or intensive care unit (ICU). We also considered the data of all patients with COVID-19 living in Lombardy, evaluating the same classification adding the death rates.

Table 1 shows the demographic and clinical data. As of today (April 11), 17 children had COVID-19 diagnosis based on clinical data and positive swab (RT-PCR analysis). There was a slight predominance of males (58.8%), the median age was 4 years. Five children required the home isolation as the symptoms were very mild; 12 were admitted at the hospital: 3 (25%) required low-intensity care, 8 (66.7%) sub-intensive care and 1 (8.3%) ICU admission.

TABLE 1. Demographic and COVID-19 Data in Lombardy Region and Pediatric Patients with COVID-19+ living in Pavia District

	Lombardy Region
Total population	10,088,484
COVID-19+, n (%)	54,802 (0.54%)
Age (years)*	62 [51–80]
Males (%)	67 %
Home isolation, n (%)	16,042 (29.3%)
Low-medium-intensity care unit, n (%)	11,796 (21.5%)
ICU admissions, n (%)	1,236 (2.3%)
Deaths, n (%)	10,022 (18.3%)
	Pavia District
Total population	545,888
Pediatric population, ≤18 years, n (% total population)	90,556 (16.6 %)
COVID+ total (% total population)	2963 (0.54 %)
COVID+ pediatric (% COVID+ total)	17 (0.57 %)
Age (years)*	4 [2–10]
Male gender, n/N (%)	10 (58.8 %)
Home isolation, n/N (%)	5 (29.5%)
Hospitalization, n/N (%)	12 (70.5 %)
Low-intensity care unit, n/N (%)	3/12 (25 %)
Sub-intensive care unit, n/N (%)	8 (66.7 %)
ICU admissions, n/N (%)	1 (8.3 %)
Deaths, n/N (%)	0

*Figures represent median values and figures in squared parentheses represent first and third quartiles.

COVID-19, coronavirus disease 2019; ICU, intensive care unit.

Figures in round parentheses represent percentages.

Analyzing the data concerning the whole Lombardy population, 29.3% of patients with COVID-19 had home isolation, 21.5% required low-medium-intensity care, 2.3% ICU admission, and 18.3% died. Therefore, there is, presently, convincing evidence that COVID-19 causes a mild-moderate disease in childhood. Consistently, no child has died so far in Italy. Indeed, disease severity, namely intensity of requested care and mortality rate, progressively increased with age. These findings could be interpreted as reassuring for the pediatric age and young adulthood. On the other hand, COVID-19 may seriously affect elderly people, requiring an outstanding care concentration.

These outcomes were consistent with the literature data.[2,3] Several hypotheses were envisaged, including the different frequency of angiotensin converting enzyme 2 (ACE2) expression on pneumocytes, which is higher in the elderly and male. ACE2 is the receptor for coronavirus, thus overexpression promotes infection. Hypertension, chronic respiratory diseases, cancer and metabolic disorders were also reported frequent comorbidity, common in older subjects.[4,5] However, no conclusive factors have been defined still now. On the other hand, children seem to be protected thanks to some probable mechanisms. Children have usually fewer comorbidity, ACE2 is under-expressed and do not smoke (smoking is associated with increased expression of ACE2), have a large thymic repertoire and sustained innate immunity, more T and B regulatory lymphocytes than adults, and received a wide vaccination program. As a result, children could have a more protective immune response than adults.

Therefore, the current data confirm the good prognosis in children. An ongoing study is investigating more detailed risk factors in this population.

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