

DR. LUCA PECORARO (Orcid ID : 0000-0002-9765-8006)

Article type : Brief Report

TITLE

The psycho-physical impact that COVID-19 has on children must not be underestimated

AUTHORS

Luca Pecoraro^{1,2}, Luca Dalle Carbonare¹, Lucia De Franceschi¹, Giorgio Piacentini³, Angelo Pietrobelli^{3,4}

¹Department of Medicine, University of Verona, Verona, Italy

²Paediatric Clinic, ASST Mantua, Mantua, Italy

³Pediatric Unit, Department of Surgical Sciences, Dentistry, Gynecology and Pediatrics, University of Verona, Verona, Italy

⁴Pennington Biomedical Research Center, Baton Rouge, 70808, LA, USA

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/APA.15347](https://doi.org/10.1111/APA.15347)

This article is protected by copyright. All rights reserved

CORRESPONDING AUTHOR

Luca Pecoraro, MD

lucapecoraro88@gmail.com

FUNDING

None

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

Italy has been one of the European countries that has been most affected by the COVID-19 pandemic. By 16 April 2020, 159,107 Italian residents had tested positive for COVID-19 and these included 1,123 children, up to nine years of age (0.7%) and 1,804 adolescents, aged between 10 and 19 years old (1.1%) (1). These data were in line with the case studies reported for the Chinese population, where the respective percentage (proportion) was 0.9% and 1.2% respectively (2). A five-year-old Italian child, who had been affected by many previous and unspecified pathologies, died after testing positive for COVID-19 infection (1). The lower vulnerability of the paediatric population to COVID-19 seems evident.

The reasons for this evidence seem to be due to both external factors and factors related to the children's immune systems. The external factors include that before the lockdown children were less likely than adults to visit certain places that could have facilitated the spread of the virus, such as

train stations and airports. They also seem to show an intrinsic resistance to COVID-19 and three explanations have been suggested for this. First and foremost is that children demonstrate greater expression of the innate immune response, which is more effective against this virus than in adults. The second reason can be represented by the likely limited growth of COVID-19 due to the phenomena of direct virus-to-virus interactions and competition, attributable to the presence of other simultaneous viruses in the mucosa of lungs and airways, which are common in children. Finally, the third is a lower expression of viral receptors that act as COVID-19 lung docking points, in particular angiotensin converting enzyme-type 2 (2,3). The attenuated immune response against COVID-19 makes it difficult to recognise the disease in children, as it often presents with symptoms that are similar to those that appear when other viruses affect children's airways. A study of cases admitted to Wuhan Children's Hospital, in the city where the pandemic originated, showed that the COVID-19 clinical correlates seem to be less severe in children than in adults. Specifically, fever was present in 60% of cases and the respiratory and gastrointestinal systems were the most affected. About laboratory framework, it was often been similar to that of influenza. The most significant data regarded the inflammatory indices. Procalcitonin appeared more sensitive than C-reactive protein when measured by polymerase chain reaction, with evidence of

elevated procalcitonin in 80% of cases and elevated polymerase chain reactions in 40% of cases. Lastly, the radiological features of the chest computed tomography scans that were performed were similar to those found in adulthood, with the evidence of abnormalities in 80 % of cases. The average length of stay was 1-2 weeks and was based on supportive treatment as, no paediatric medication has been licensed for this disease (4,5).

Since 10 March 2020, the entire Italian peninsula has been a red zone and nearly 10 million children and adolescents have been isolated at home. Ongoing decisions about the lockdown measures were awaited from the Ministry of Health at the time of writing (1). The strict lockdown in China, lead to a decrease in infections, but also had potential physical and psychological consequences on the health of children and adolescents. We know that when they aren't at school, for example during the summer holidays, they are less physically active, their normal wake sleep patterns are different and they spend more time on sedentary activities like watching television. Children tend to spend more time outside with their peers at school. However, they have been unable to do this during quarantine and this could trigger a vicious circle of psychological and physical repercussions (6). The analysis by Sprang and Silman appears extremely significant in this regard. Their 2013 paper reported that posttraumatic stress disorder scores were four times higher in paediatric patients who

were quarantined during epidemic or pandemics events than those whose movements were not restricted (7).

Interventions to avoid the risk of physical and psychological repercussions in paediatric age are possible and can take place on three different levels. The first is to encourage parents to be role models of optimal psychophysical health and make sure they understand the first signs of psychological and physical repercussions in their children. Secondly, psychologists can play a very important role, as they can support parents to alleviate the tensions created by this unique situation. Most children and adolescents have never experienced a pandemic, which has been continually mentioned by the mass media and social networks and required such a strict lockdown. The third is that the role of teachers and social policies must not be forgotten. They need to promote motivational messages that create optimal psycho-physical health and encourage children to engage in physical activity, maintain a balanced diet, establish regular sleep-wake rhythms and observe adequate personal hygiene. In other words, the impact of the COVID-19 outbreak does not just have infectious disease repercussions for paediatric patients. It also has psycho-physical impacts (6) and these must not to be underestimated.

REFERENCES

1. Epidemia COVID-19. Istituto Superiore di Sanità. Rome.
https://www.epicentro.iss.it/coronavirus/bollettino/Bollettino-sorveglianza-integrata-COVID-19_16-aprile-2020.pdf (accessed 17 April 2020).
2. Lee PI, Hu YL, Chen PY, et al. Are children less susceptible to COVID-19? *J Microbiol Immunol Infect.* 2020.
<https://doi.org/10.1016/j.jmii.2020.02.011>.
3. Brodin P. Why is COVID-19 so mild in children? *Acta Paediatr.* 2020; doi: 10.1111/apa.15271. [Epub ahead of print].
4. Xia W, Shao J, Guo Y, et al. Clinical and CT features in pediatric patients with COVID-19 infection: Different points from adults. *Pediatr Pulmonol.* 2020;55:1159–1164.
5. Ludvigsson JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults. *Acta Paediatr.* 2020; doi: 10.1111/apa.15270. [Epub ahead of print].
6. Wang G, Zhang Y, Zhao J, et al. Mitigate the effects of home confinement on children during the COVID-19 outbreak. *Lancet.* 2020. 395 (10228):945-947.
7. Sprang G, Silman M. Posttraumatic stress disorder in parents and youth after health-related disasters. *Disaster Med Public Health Prep.* 2013; 7:105–110.