

A DIFFERENT VIEW

Clinicians need to be careful that they do not confuse mental health issues and long COVID in children and adolescents

Giorgio Cozzi¹  | Federico Marchetti² | Egidio Barbi^{1,3} ¹Institute for Maternal and Child Health IRCCS Burlo Garofolo, Trieste, Italy²Department of Pediatrics, Santa Maria delle Croci Hospital, Ravenna, Italy³University of Trieste, Trieste, Italy**Correspondence**

Giorgio Cozzi, Institute for Maternal and Child Health, IRCCS Burlo Garofolo, Via dell'Istria 65/1, 34137, Trieste, Italy.

Email: giorgio.cozzi@burlo.trieste.it**Funding information**

No external funding.

Significant concerns have been expressed about the long-term effects of the COVID-19 pandemic on children and adolescents. At the time of writing, more than 1000 papers on this subject had been published on PubMed, but most of them focused on adult subjects.

A number of terms have been used to describe the long-term symptoms experienced by patients after they have been infected with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). These are post-COVID syndrome, post-acute sequelae of SARS-CoV-2 (PACS) and long COVID.¹ Long COVID is the term that has been most frequently used by scientific papers.

It is remarkable that the diagnostic criteria for long COVID are still not well defined and not unanimously recognised by scientific organisations. In addition, the mechanisms by which this condition develops are still not clear despite several pathophysiological hypotheses.²

Usually, the term long COVID refers to patients who have symptoms that persist much longer than expected after their acute SARS-CoV-2 infection. However, there is no agreement on the actual duration of symptoms, or their classification, when it comes to determining a long COVID diagnosis. A considerable number of manifestations have been linked to this condition, with one study reporting an astonishing feature of 200 symptoms from 10 organ systems.³ Most of them are common in the general adult population, such as fatigue, sleep disturbances, headaches and problems concentrating, but less research has been carried out on long COVID in children.

It has been estimated that up to 40% of adult subjects have developed symptoms that suggest long COVID after acute SARS-CoV-2 infections. In addition, this condition does not seem to be

related to the severity of the acute disease, as it has also been frequently reported in subjects who were asymptomatic or had mild symptoms during the acute infection.²

Various studies have been published that have aimed to evaluate whether children and adolescents may develop long-term symptoms after a SARS-CoV-2 acute infection. The first case series, from Sweden, Holland and Israel, reported that children and adolescents had persistent symptoms after contracting the virus. They complained of long-lasting physical symptoms, such as severe fatigue, palpitations, headaches and problems concentrating, which severely impaired.

One paper reviewed 14 studies carried out in Europe, the USA and Australia, which were based on online questionnaires and phone interviews, without complete clinical evaluations. The percentages of the 19,426 children and adolescents who continued to report symptoms after acute SARS-CoV-2 infections varied widely between the studies, from 4% to 66%.⁴ The symptoms that were most frequently reported were headaches (3%-80%), fatigue (3%-87%), disturbed sleep (2%-63%), problems concentrating (2%-81%), abdominal pain (1%-76%) and myalgias-arthralgias (1%-61%). Six studies found a correlation between how persistent the symptoms were and the subject's age, with a peak in adolescence. Three investigations found correlations with female gender and one study linked ongoing problems with the previous presence of an organic disease or a mental health disorder. The authors pointed out that most of the studies did not have control groups.⁴

However, one nationwide Danish cohort study did compare the prevalence and type of symptoms reported by children and adolescents aged 0-17 years during the pandemic.⁵ The analysed cohort

Abbreviations: SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2022 The Authors. *Acta Paediatrica* published by John Wiley & Sons Ltd on behalf of Foundation Acta Paediatrica.

comprised 15,041 with a recently verified SARS-CoV-2 infection and 15,080 without. The authors reported that the prevalence of symptoms was similar in the two groups. It was remarkable that it showed that school children, aged 6–17 years, who had not been infected with SARS-CoV-2 reported significantly more problems concentrating, headaches, muscle and joint pain than those who had been infected.⁵

Despite the small number of studies that have been carried out and their limitations, we can deduce some helpful information about the symptoms experienced by children and adolescents who have been categorised as having long COVID. The considerable variations in the prevalence of this condition among studies leads to the hypothesis that other factors, as well as, the acute infection, may play a considerable role in the development of this condition. The subjects who have been affected have primarily been adolescents, with slightly more females. They mainly present with subjective physical symptoms. Fatigue has been the most frequently reported symptom, followed by pain, problems concentrating and disturbed sleep. Subjects often have multiple symptoms at the same time and these tend to last a long time, even months. These symptoms have a very negative impact on their quality of life, due to severe daily limitations and social isolation.

One study from the USA was conducted in a clinic that had been specifically created for children and adolescents with long COVID. It reported that a multidisciplinary rehabilitative approach, which aimed to regain functioning led to significant improvements in the symptoms experienced by these subjects.⁶ The intervention involved a team of paediatricians, neurophysiologists, psychologists, psychiatrists and physiotherapists.

In the decade before the pandemic, increasing number of adolescents were evaluated in medical clinics and emergency departments for long-lasting physical symptoms that veiled mental health issues. These included somatic symptom disorders, anxiety disorders and depression.⁷ The specific clinical features reported by adolescents categorised as affected by long COVID seem to mirror the highly suggestive symptoms for somatic symptoms and mental health disorders in general. They have also been more prevalent in adolescents, patients with long-lasting physical symptoms, severe fatigue and chronic pain and those who are unable to attend school because they feel sick, subjects socially isolated who and have a poor quality of life.⁷ As mentioned, adolescents with long COVID are likely to benefit from the same effective multidisciplinary therapeutic approaches, aimed to regain functioning, for patients with somatic symptom disorder.⁷ Clinical practice experience and study data indicate that patients with features that suggested somatic symptom disorders frequently received other diagnostic labels, based on the types of symptoms and the clinics they were referred to. These may include chronic fatigue syndrome, fibromyalgia and chronic Lyme disease. Moreover, we know that these subjects face a high risk of inappropriate medication and treatment and undergo repeated diagnostic tests, specialistic evaluations and hospital admissions.

The COVID-19 pandemic appears to have been much less harmful to children and adolescents than adults in terms of the severity of the acute viral infection. However, it has clearly had a strong impact on their well-being and mental health.

During pandemic lockdowns children and adolescents were forced to remain at home, schools were closed, and sporting activities were cancelled. After lockdowns ended, many European countries continued to use, distance learning and prohibited indoor sports activities and gathering. Meeting places remained closed and social activities continued to face strong restrictions.

A number of systematic reviews and meta-analyses have highlighted how all these measures, together with other factors, have increased anxiety, post-traumatic symptoms and depression in children and adolescents.^{8,9} These include difficult family relationship, socioeconomic stress, being worried about the health of relatives, grief when loved ones die and the loss of supportive environments. One meta-analysis of 29 studies, which covered 80,879 subjects, reported that one in four children and adolescents globally were experiencing elevated depressive symptoms.⁹ The authors also reported that one in five had elevated anxiety symptoms. These rates were double the pre-pandemic levels.⁹

Another study has reported that new diagnoses and hospitalisations for eating disorders during the pandemic have followed the same trend, with sharp increases being recorded.¹⁰

We do not assume that all individuals who continue to experience symptoms after a SARS-CoV-2 acute infection will have mental health issues. However, we should be fully aware that this pandemic places a huge burden of emotional distress and suffering on children and adolescents. If clinicians assume that paediatric patients have long COVID, without critically assessing all the possibilities, they risk not recognising patients with mental health issues. Even worse, they will be unintentionally perpetuating, and strengthening, symptoms in subjects who are prone to mental health issues. The need to describe new medical conditions and label patients clearly has risks in this context.

Children and adolescents with persistent symptoms after a SARS-CoV-2 acute infection need to undergo systematic multidisciplinary assessments, based on high suspicion of mental health issues in order to regain functioning.

ACKNOWLEDGEMENTS

The authors thank Martina Bradaschia for the initial English revision of the manuscript.

CONFLICT OF INTERESTS

The authors have no conflicts of interest to declare.

ORCID

Giorgio Cozzi  <https://orcid.org/0000-0002-6427-1366>

Egidio Barbi  <https://orcid.org/0000-0002-6343-846X>

REFERENCES

1. Nalbandian A, Sehgal K, Gupta A, et al. Post-acute COVID-19 syndrome. *Nat Med.* 2021;27:601-615.
2. Crook H, Raza S, Nowell J, et al. Long covid-mechanisms, risk factors, and management. *BMJ.* 2021;374:n1648.
3. Lopez-Leon S, Wegman-Ostrosky T, Perelman C, et al. More than 50 long-term effects of COVID-19: a systematic review and meta-analysis. *Sci Rep.* 2021;11:16144.

4. Zimmermann P, Pittet LF, Curtis N. How common is long-COVID in children and adolescents? *Pediatr Infect Dis J*. 2021;40:e482-e487.
5. Borch L, Holm M, Knudsen M, et al. Long COVID symptoms and duration in SARS-CoV-2 positive children – a nationwide cohort study. *European J Pediatr*. 2022;11:1-11.
6. Morrow AK, Ng R, Vargas G, et al. Postacute/Long COVID in pediatrics: development of a multidisciplinary rehabilitation clinic and preliminary case series. *Am J Phys Med Rehabil*. 2021;100:1140-1147.
7. Cozzi G, Lucarelli A, Borrometi F, et al. How to recognize and manage psychosomatic pain in the pediatric emergency department. *Ital J Pediatr*. 2021;47:74.
8. Viner R, Russell S, Saullé R, et al. School Closures During Social Lockdowns and Mental Health, Health Behaviors, and Well-being Among Children and Adolescents During the First COVID-19 Wave: A Systematic Review. *JAMA Pediatr*. 2022;58:40.
9. Racine N, McArthur BA, Cooke JE, et al. Global Prevalence of Depressive and Anxiety Symptoms in Children and Adolescents During COVID-19: A Meta-analysis. *JAMA Pediatr*. 2021;175:1142-1150.
10. Agostino H, Burstein B, Moubayed D, et al. Trends in the Incidence of New-Onset Anorexia Nervosa and Atypical Anorexia Nervosa Among Youth During the COVID-19 pandemic in Canada. *JAMA Netw Open*. 2021;4:e2137395.



Giorgio Cozzi

Federico Marchetti

Egidio Barbi

How to cite this article: Cozzi G, Marchetti F, Barbi E.

Clinicians need to be careful that they do not confuse mental health issues and long COVID in children and adolescents.

Acta Paediatr. 2023;112:180–182. doi:[10.1111/apa.16332](https://doi.org/10.1111/apa.16332)