ECRONICON OPEN ACCESS

EC PAEDIATRICS
Mini Review

Precocious Puberty in Girls: Is it Time to Change the Definition?

Jorge Sales Marques*

Center of Diagnosis and Evaluation of Rare Disorders, Hospital Cuf Porto, Portugal

***Corresponding Author:** Jorge Sales Marques, Center of Diagnosis and Evaluation of Rare Disorders, Hospital Cuf Porto, Portugal.

Received: December 10, 2025; **Published:** January 09, 2026

Abstract

Precocious puberty in girls (PPG) is defined as all sexual character that appears before the age of 8 years.

The typical signs included: breast enlargement, presence of pubic hair, body odor, early menstruation and increase growth velocity above normal for the age, with accelerate bone age. Central and peripheral PP are the main causes.

In the last years, particularly after Covid 19 pandemic, we observed many girls between 7 to 8 years of age, with signs of precocious puberty, but with all normal tests (hormone, bone age and pelvic ultrasound).

In this article of opinion, the author explained why this happened and proposed that in near future after more studies, may need to change the definition for precocious puberty in girls.

Keywords: *Precocious Puberty; Girls; Covid 19; Definition*

Introduction

Precocious puberty in girls (PPG) is defined as all sexual character that appears before the age of 8 years.

The typical signs included: breast enlargement, presence of pubic hair, body odor, early menstruation and increase growth velocity above normal for the age, with accelerate bone age.

There are two main causes: central that is most common and they are mainly idiopathic. The other reasons are CNS lesions like tumor, infection, trauma or radiation and genetic mutations (DLK1 and MKRN3).

The other cause of PPG is peripheral (adrenal hyperplasia, ovaries cysts).

When we have a girl with signs of precocious puberty, to do the diagnose, we include hormone study (LH, FSH, estradiol levels, GnRH stimulation test), pelvic ultrasound to check for the uterus and ovaries size and cyst, and wrist x-ray for the determination of the bone age. In girls less than 6 years with neurological signs, rapid progression and atypical findings, we need to advance for brain MRI [1].

What we observed nowadays?

In the last years, particularly after Covid 19 pandemic, we observed many girls between 7 to 8 years of age, with signs of precocious puberty, that after all studies, we find normal results of hormone tests, pelvic ultrasound and without advance of the bone age. After 6 months to one year of follow-up, all the studies were still normal, with no development of their sexual characteristic signs.

This is a reality that has been observed in outpatient department [2-4].

Why it happened?

Is it a coincidence that those earlier signs appears in girls after Covid 19? Why not in boys?

There are some factors that can explain this evidence:

1. Increased body weight and obesity:

- Body fat produces leptin, a hormone that triggers the onset of puberty.
- Higher-calorie food, less exercise.
- More weight.
- Earlier puberty.

This is the factor with the strongest evidence.

2. Exposure to endocrine disruptors:

Chemicals that mimic hormones:

- Plastics (BPA), cosmetics, pesticides, perfumes, fragranced creams.
- Can stimulate sex hormones and accelerate development.

3. Psychological stress and emotional changes:

- Stressful environment, anxiety, sleep disturbances.
- The body may activate hormonal survival mechanisms earlier.

4. Sedentary lifestyle, screens, and poorer sleep:

- Sleeping late and poorly alters melatonin, which normally inhibits puberty.

5. Genetics + Environment:

- Daughters of mothers who experienced precocious puberty are at higher risk.
- Puberty depends on many genes + environment [5-8].

Any connection to Covid 19?

Several observational studies in different countries have shown that the number of cases of precocious puberty in girls increased during the COVID-19 period, especially during periods of confinement and lockdowns.

Example 1: In Shanghai, monthly rates of precocious puberty were higher during the pandemic compared to before, with changes in hormonal markers such as GnRH, MKRN3, and ghrelin [3].

Example 2: In several locations in China and Italy, there was a significant increase in new cases of precocious puberty during and after the confinement period [3,6,8],

Scientific reviews indicate that many observational studies in different countries found a 1.3 to 5-fold increase in cases in girls during the pandemic [3,5-8].

What could be behind this relationship?

So far, there is no strong evidence that infection with the SARS-CoV-2 virus directly causes precocious puberty (i.e. there is no proven direct biological mechanism by the virus to induce puberty). What most studies suggest is an indirect association linked to the context of the pandemic—not directly to the virus itself [3,5-8].

Lifestyle factors during the pandemic

During the pandemic, especially during lockdowns, many factors influencing the onset of puberty changed:

- Girls diagnosed during the pandemic tended to spend more time in front of screens and with less physical activity.
- The body mass index (BMI) of girls diagnosed with precocious puberty during the pandemic was frequently higher. Elevated body weight is a known risk factor for precocious puberty because body fat plays a role in hormone production.
- Higher calorie diets, less exposure to natural light, sleep disorders, and increased family stress can affect the hormonal systems that regulate the onset of puberty [6-8].

How to compare this relationship scientifically?

When you want to compare this type of relationship, you can structure the analysis like this:

1. Identify the groups being compared:
    - Before the pandemic (historical diagnostic data).
    - During/After the pandemic (diagnostic data in the same age group).
2. Compare incidence rates:
    - How many cases per month/year in each period?
    - Percentage increase in cases?
3. Compare risk factors:
    - BMI, physical activity data, screen time, sleep patterns.
    - Observe if these factors changed with lockdown.
4. Controls external variables:
    - Age, family history, general health.
    - Other factors such as exposure to endocrine disruptors, which can also influence.
5. Interpret with care:
    - An association does not mean direct causation.
    - There may be many interrelated factors (lifestyle, stress, hormonal changes).
6. Relationship between COVID-19 and precocious puberty:

- Observational studies have shown an increase in cases of precocious puberty in girls during the pandemic period.
- This increase is more associated with lifestyle changes caused by lockdown and the pandemic situation (such as increased sedentary behavior, weight gain, sleep disorders) than with a direct effect of the virus itself.
- It is important to continue monitoring with controlled studies to better understand the causes and mechanisms.

Studies conducted in 2021–2024 show a clear increase in precocious puberty during the pandemic, especially in girls.

Why is it almost unnoticeable in boys?

There are 3 main reasons:

1. Girls' bodies are much more sensitive to body fat and chemicals

- The female hormonal system reacts earlier to these stimuli.

2. In boys, the initial signs are less visible

- First, the testicle grows, something that is not as noticeable as breast development in girls

3. Early puberty in boys is rare.

- When it happens, it is more concerning and always requires medical evaluation and screening for tumors that are behind the cause of the early symptoms [2,3,5-8].

What we can do now?

Precocious puberty with clinical symptoms seems that are not pathologic, but normal for this post-Covid 19 era.

After some more studies and data, if keep confirming this observation, the definition of precocious puberty in girls should be change to signs and symptoms of puberty that appears before the age of 7 years.

Conclusion

Precocious puberty in girls after Covid 19 era, was caused not directly by the virus but secondary to lifestyle, increase body mass index and stress.

After more retrospective studies, if confirm this observation, the definition of precocious puberty in girls should be change to signs and symptoms of puberty before the age of 7 years of age.

Bibliography

1. Gemelli IF., *et al*. "Association of body composition and age at menarche in girls and adolescents in the Brazilian Legal Amazon". *Journal of Pediatrics (Rio J)* 96.2 (2020): 240-246.

2. Dias Donegá MJ., *et al*. "The impact of the COVID-19 pandemic on early puberty: a narrative review of the literature". *Ulakes Journal of Medicine* 5.1 (2025).

3. L Zhai., *et al*. "Association of obesity with onset of puberty and sex hormones in Chinese girls: a 4-year longitudinal study". *PLoS One* 10.8 (2015): e0134656.

4. Silva MTS da., *et al*. "Puberdade precoce em meninas: uma revisão narrative". *Observatório de la Economia Latinoamericana* 22.5 (2024): e4902.

5. Acar S and Özkan B. "Increased frequency of idiopathic central precocious puberty in girls during the COVID-19 pandemic: preliminary results of a tertiary center study". *Journal of Pediatric Endocrinology and Metabolism* 35.2 (2021): 249-251.

6. Chioma L., *et al*. "Sedentary lifestyle and precocious puberty in girls during COVID-19 pandemic: an Italian experience". *Endocrine Connections* 11.2 (2022): e210650.

7. Street ME., *et al*. "Precocious puberty and COVID-19 into perspective: potential increased frequency, possible causes, and a potential emergency to be addressed". *Frontiers in Pediatrics* 9 (2021): 734899.

8. Stagi S., *et al*. "Increased incidence of precocious and accelerated puberty in females during and after the Italian lockdown for the coronavirus 2019 (COVID-19) pandemic". *Italian Journal of Pediatrics* 46.1 (2020): 165.

Volume 15 Issue 2 February 2026