

# Precocious puberty in relation to the COVID-19 pandemic. A survey among Argentine pediatric endocrinologists

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## ABSTRACT

**Introduction.** Puberty is manifested initially by the onset of secondary sexual characteristics as a result of hormonal changes that progressively lead to complete sexual maturity. In Argentina and worldwide, the lockdown resulting from the SARS-CoV-2 pandemic may have interfered in the onset and timing of pubertal development.

**Objective.** To describe the perception of pediatric endocrinologists in Argentina regarding consultations for suspected precocious and/or rapidly progressive puberty during the pandemic.

**Materials and methods.** Descriptive, observational, cross-sectional study. Anonymous survey among pediatric endocrinologists members of the *Sociedad Argentina de Pediatría* and/or the *Asociación de Endocrinología Pediátrica Argentina* administered in December 2021.

**Results.** Out of 144 pediatric endocrinologists, 83 completed the survey (rate of response: 58%). All of them considered that consultation for precocious or early puberty increased, either in terms of early thelarche (84%), early pubarche (26%), and/or precocious puberty (95%). Ninety-nine percent agreed that this has occurred to a greater extent in girls. All survey respondents also consider that the diagnosis of central precocious puberty has increased. In total, 96.4% of respondents consider that the number of patients treated with GnRH analogs has increased.

**Conclusion.** Our results about the perception of pediatric endocrinologists are consistent with data published in other regions on the increase in the diagnosis of precocious puberty during the COVID-19 pandemic. We underscore the need to develop national registries of central precocious puberty, and to disseminate the evidence for a timely detection and management.

**Key words:** COVID-19; SARS-CoV-2; precocious puberty; disorder of sex development.

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## INTRODUCTION

Puberty, a transitional period from childhood to adulthood, is manifested initially by the onset of secondary sexual characteristics as a result of hormonal changes that progressively lead to complete sexual maturity. The age of puberty in humans is strongly influenced by genetic, ethnic, nutritional, and environmental factors.<sup>1</sup>

Central precocious puberty (CPP) in girls is currently defined as the onset of Tanner stage 2 of breast development (progressive in nature) before the age of 8 years associated with increased growth velocity and progression of skeletal maturation. CPP in boys is characterized by an increase in testicular size greater than or equal to 4 mL before 9 years old.<sup>1-3</sup>

In girls, the age of 8 years has been widely accepted as the cutoff for the onset of pubertal development. Although in the USA and Europe, since the 19<sup>th</sup> century, there has been an advance in the age of menarche (a secular trend) as a consequence of better living conditions, this trend seems to have ceased over the past 3 decades.<sup>4,5</sup> In Argentina, the most recent study by the *Sociedad Argentina de Pediatría*, (SAP) conducted in healthy female adolescents from all over the country has shown that the average age at the onset of menarche is 12.45 years.<sup>6</sup> Little difference is observed from previous data from 1980, which reported an average age at the onset of menarche of 12.53 years.<sup>7</sup> While genetic factors undoubtedly play an important role in the age of puberty onset, there is consensus that other variables also influence the age of puberty onset and progression (tempo). These variables include weight, fetal and infant nutrition, dietary habits, physical activity, psychological factors, and exposure to electromagnetic fields (EMF) and/or chemical substances considered endocrine disruptors. In Argentina and worldwide, the COVID-19 pandemic that emerged at the end of 2019 in China resulted in a lockdown that may have impacted these factors and interfered in the onset and tempo of pubertal development.

Recent studies carried out in Europe<sup>8-10</sup> found a higher incidence of new cases of CPP and a faster rate of progression of puberty in patients with a previous diagnosis during and after the COVID-19 lockdown, compared to previous years.

The hypothesis proposed by the authors is that factors linked to the strict lockdown to which the Italian population has been subjected by the COVID-19 pandemic, such as increased body mass index (BMI) and the use of electronic

devices, could have affected (advanced/accelerated) the onset and progression of puberty.

However, further studies are required to determine the causative factors involved in this finding and the interaction among them.<sup>8</sup>

## OBJECTIVE

To describe the perception of pediatric endocrinologists in Argentina regarding consultations for suspected precocious and/or rapidly progressive puberty during the pandemic and invite those interested in participating in further studies on this topic.

## MATERIALS AND METHODS

This was a descriptive, observational, cross-sectional study.

During December 2021, an anonymous survey was sent by e-mail to pediatric endocrinologists members of the SAP and/or the *Asociación de Endocrinología Pediátrica Argentina*, (ADEPA). All health care providers who met the inclusion criteria were invited to participate based on the list of pediatric endocrinologists enrolled in the SAP and the ADEPA. The submission of answers was documented as an agreement to participate in the study. This was a self-administered survey that included a header inviting participants to complete the questionnaire. Those who refused to participate and resident physicians or physicians in training were excluded. The anonymous survey format was used in order to mitigate any reporting bias, especially regarding the ancillary studies requested at the beginning.

The following data were recorded in relation to variables: place of origin, work setting (public or private health care providers), modality of care (in person or teleconsultation), prevalent reasons for consultation before and during the pandemic, change in the number of consultations for precocious puberty and rapidly progressive puberty, sex of individuals with CPP, potential causes, diagnostic studies requested, and treatment provided (*Supplementary material*).

The pre-pandemic period was defined as the period between March 2019 and March 2020, and the pandemic period, as that between March 2020 and September 2021, considering the return to in-person classes according to the regulations established by Argentina.

## Statistical analysis

Continuous variables were described as mean and standard deviation or as median and

interquartile range, according to the distribution observed. Categorical variables were described as absolute number (n) and percentage (%).

### Ethical considerations

This study was approved by the Research Ethics Committee of Hospital de Niños Dr. Ricardo Gutiérrez.

### RESULTS

The survey was completed by 83 of 144 pediatric endocrinologists members of the ADEPA and/or the SAP (rate of response: 58%). The population characteristics are described in Table 1.

Regarding the different reasons for consultation before and during the pandemic, a greater frequency of consultation was noted in relation to pubertal development and a decrease was observed in other historically more frequent reasons, such as thyroid or growth disorders (Figure 1).

The 83 pediatric endocrinologists considered that consultation for precocious or early puberty increased, either in terms of early thelarche (84%), early pubarche (26%), and/or precocious puberty (95%). Ninety-nine percent agreed that this has occurred to a greater extent in girls. All survey respondents also consider that the diagnosis of CPP has increased.

TABLE 1. Demographic and occupational characteristics of surveyed health care providers

Province(s) where they work	N = 83	%
Buenos Aires	27	32.5
City of Buenos Aires	27	32.5
Buenos Aires, City of Buenos Aires	9	10.8
Córdoba	4	4.8
Santa Fe	3	3.6
Mendoza	3	3.6
Neuquén	2	2.4
Buenos Aires, Chubut, La Pampa, Río Negro	1	1.2
Buenos Aires, the City of Buenos Aires, Entre Ríos	1	1.2
Mendoza, San Luis	1	1.2
Jujuy	1	1.2
Misiones	1	1.2
Neuquén, Río Negro	1	1.2
San Juan	1	1.2
Santa Cruz	1	1.2

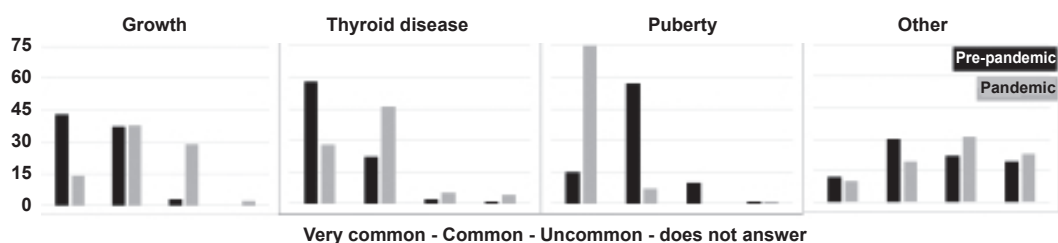
  

Work setting		
Public and private	56	67.5
Private	25	30.1
Public	2	2.4

Work modality		
In-person consultation and teleconsultation	69	83
In-person consultation	14	17
Teleconsultation	0	0

FIGURE 1. Reasons for consultation with Pediatric Endocrinology before and after the pandemic



Tables 2 and 3 list potential causes (expressed as percentage) that respondents considered may have been related to the increase in the incidence of precocious puberty and consultation for suspected precocious puberty, respectively.

In total, 96.4% of respondents consider that the number of patients treated with gonadotropin-releasing hormone (GnRH) analogs has

increased.

To diagnose precocious puberty, most endocrinologists rely on the clinical course and ancillary studies, such as gynecological ultrasound, bone age, and baseline serum gonadotropin levels (Figure 2). It was observed that 5/83 and 9/83 specialists never request other studies as part of their clinical practice, such as

**TABLE 2. Causes possibly related to an increased incidence of precocious puberty associated with the COVID-19 pandemic**

	N	%
Increase in overweight/obesity in the pediatric population	72	86.7
Increased exposure to electronic device screens	70	84.3
Psychoemotional stress related to the pandemic and lockdown	64	77.1
Changes in sleep and dietary routine	59	71.1
Increased exposure to endocrine disruptors	56	67.5
Other: unknown, greater parental observation	5	< 3.5

**TABLE 3. Causes possibly related to an increase in specialty consultations due to suspected accelerated and/or precocious puberty during the COVID-19 pandemic**

	N	%
Increased prevalence in the past 5 years	45	54.9
Increased awareness about the topic among parents	48	58.5
Increased awareness about the topic among pediatricians	50	60.1
Availability of affordable, reliable, and safe treatments	24	29.3
Other: Increase directly related to the pandemic	4	4.8
Pharmaceutical industry marketing	1	1.2

luteinizing hormone-releasing hormone (LHRH) stimulation tests and pituitary and central nervous system magnetic resonance imaging.

## DISCUSSION

Surveys administered to health care providers have been used in multiple settings and regions, and make up the first approach to such topics of interest, serving as hypothesis generators for future projects. The survey was sent to health care providers from different Argentine provinces that are members of the participating organizations. This study has allowed us to assess the perception of different pediatric endocrinologists regarding changes in the reasons for consultation before

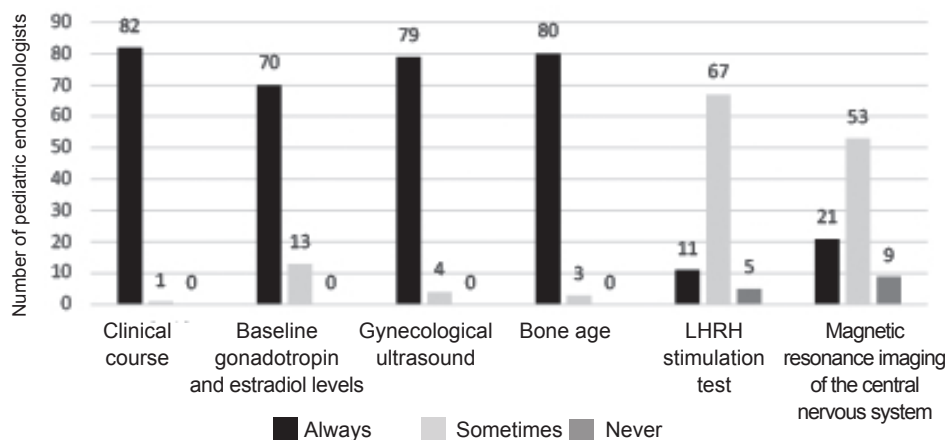
and during the COVID-19 pandemic.

Most pediatric endocrinologists who completed the survey work in the City of Buenos Aires and in the province of Buenos Aires, which is consistent with the majority distribution of health care providers in these areas.

A high level of agreement was observed regarding the increase in consultation for precocious puberty during the pandemic, compared to other reasons for consultation and in relation to the pre-pandemic period close to 100%.

Other international studies have published similar results. Stagi et al.,<sup>8</sup> described, in Italian girls, an increase in the incidence of new cases

FIGURE 2. Criteria used for precocious puberty diagnosis



LHRH: luteinizing hormone-releasing hormone.

of precocious puberty and an accelerated rate of progression of puberty before and during the COVID-19 lockdown, as compared to the same period assessed in the previous 5 years. Also in the Italian population, Verzani et al.,<sup>9</sup> recorded an increase in the number of consultations of patients with suspected precocious puberty during 2020, compared to the same period of 2019 (224 versus 93 consultations), mainly in girls (215 versus 87).

In a study conducted in Turkey, Acar et al.,<sup>10</sup> reported a more than two-fold increase in the number of girls diagnosed with CPP in the pandemic period (April 2020–March 2021) compared to the previous 3 years.

Our study has some weaknesses: for example, it was not possible to achieve national representation, so the results may not be representative of other regions of Argentina. Although we did not conduct a reliability analysis, we performed validation processes for form, content, and questionnaire testing. Although we do not have a local or national registry yet to assess the incidence of CPP compared to the pre-pandemic period, the results of this survey confirm the observation of an increase in consultations for suspected precocious and/or early puberty among health care providers specialized in pediatric endocrinology.<sup>11</sup>

In conclusion, our results about the perception of pediatric endocrinologists are consistent with data published in other regions on the increase in the diagnosis of precocious puberty during the COVID-19 pandemic. In addition, they underscore the need to develop national registries through national collaborative work with

the support of both scientific organizations and to disseminate the evidence for the timely detection and management of this condition. ■

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Supplementary material available at: [https://www.sap.org.ar/docs/publicaciones/archivosarg/2023/2767\\_AO\\_Arcari\\_Anexo.pdf](https://www.sap.org.ar/docs/publicaciones/archivosarg/2023/2767_AO_Arcari_Anexo.pdf)

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